

MEMO**DATE:** December 28, 2015**SUBJECT:** Radiochemical Data Validation for Holy Trinity Cemetery, Lewiston, Niagara County, New York. Test America data packages 160-13353-2, 160-13353-1, and 160-13353-3.**FROM:** Rick Haaker; CHP, CIH, Chemist, Weston Solutions**TO:** Eric Daly USEPA On-Scene Coordinator

Bernard Nwosu, Weston Solutions RST 3 Site Project Manager

DCN: RST3-02-F-0063

1. Overview

This report addresses three data packages that were analyzed by TestAmerica Laboratories, of St. Louis, MO. The package numbers were 160-13353-2, 160-13353-1, and 160-13353-3. The analytes and methods are provided in Table 1.

Table 1. Isotopes and Methods.

Test America Method	Similar Standard Method	Description	Analyte
9315	SW-846 Method 9315	Separation and Gas Flow Proportional Counting (Alpha)	Radium-226
9320	SW-846 Method 9320	Separation and Gas Flow Proportional Counting (Beta)	Radium-228
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-228
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-230
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Thorium-232
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-233/234
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-235/236
A-01-R	DOE Method A01-R	Chemical Separation and Alpha Spectroscopy	Uranium-238
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Ac-228
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Americium-241

Test America Method	Similar Standard Method	Description	Analyte
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Bi-210
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Bi-212
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Bi-214
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Cesium-137
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Cobalt-60
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Eu-155
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	K-40
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Pb-210
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Pb-212
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Pb-214
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Radium-226
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Radium-228
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Th-234
GA-01-R	EPA GA_01_R	Gamma Spectroscopy	Tl-208

2. INTRODUCTION

One (1) water sample and eight (8) soil samples were collected during the time period August 12 and August 24, 2015. Table 2 provides a list of these field samples. The data was delivered in three packages. Each package included a summary report, chain of custody, case narrative, and raw data. An electronic data deliverables (EDD) was provided, which contained some, but not all, raw data and results in a readily accessible format.

The radio-analytical data were validated to Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) *Chapter 8 - Radiochemical Data Verification and Validation* and the requirements of the quality assurance project plan. The depth of the validation was necessarily limited because Derived Concentration Guidelines (DCGL), and some specific data performance requirements have not been designated.

3. DATA VALIDATION PRECAUTIONS AND LIMITATIONS

It should be noted that this technical report describes method validation and is not intended to provide guidance for validation of overall program/project objectives and requirements. Project validation is generally performed by project management personnel and involves a comprehensive review of all aspects (and objectives) of a sampling and analysis project. In Table 2, the matrix type for samples is either solid (SO) or liquid (LI).

Table 2. Samples.

CLIENT_SAMPLE_DESCRIPTION	LAB_SAMPLE_ID	MATRIX	ANALYSIS_METHOD
H001-SS001-0012-01	160-13353-1	SO	A-01-R
H001-SS001-0012-01	160-13353-1	SO	GA-01-R
H001-SS002-0012-01	160-13353-2	SO	A-01-R
H001-SS002-0012-01	160-13353-2	SO	GA-01-R
H001-SS003-0012-01	160-13353-3	SO	A-01-R
H001-SS003-0012-01	160-13353-3	SO	GA-01-R
H001-SS004-0012-01	160-13353-4	SO	A-01-R
H001-SS004-0012-01	160-13353-4	SO	GA-01-R
H001-SS005-0012-01	160-13353-5	SO	A-01-R
H001-SS005-0012-01	160-13353-5	SO	GA-01-R
H001-SS005-0012-02	160-13353-6	SO	A-01-R
H001-SS005-0012-02	160-13353-6	SO	GA-01-R
H001-SS006-0012-01	160-13353-7	SO	A-01-R
H001-SS006-0012-01	160-13353-7	SO	GA-01-R
H001-SS007-0618-01	160-13353-8	SO	A-01-R
H001-SS007-0618-01	160-13353-8	SO	GA-01-R
H001-SS008-0012-01	160-13353-9	SO	A-01-R
H001-SS008-0012-01	160-13353-9	SO	GA-01-R
RB-H-1508012	160-13353-10	LI	9315
RB-H-1508012	160-13353-10	LI	9320
RB-H-1508012	160-13353-10	LI	A-01-R
RB-H-1508012	160-13353-10	LI	GA-01-R

4. SAMPLE HANDLING AND ANALYSIS EVALUATION

This section contains the technical review comments describing the findings and observations for each of the main verification and validation parameters described in MARLAP Chapter 8 - Radiochemical Data Verification and Validation.

A. **Sample Descriptors (MARLAP 8.5.1.1)**

Each sample should have a unique identification code that can be cross-referenced to a unique laboratory identification number.

Discussion

The laboratory identification numbers were correctly listed in the cover page/case narrative in the data package. No issues of this type were recognized and no qualifiers were assigned on this basis.

B. **Aliquant Size (MARLAP 8.5.1.2)**

The aliquant or sample size used for analysis should be documented so that it can be checked when reviewing calculations, examining dilution factors or analyzing any data that requires aliquant as an input. It is also imperative that the appropriate unit (liter, kilogram, etc.) is assigned to the aliquant.

Discussion

Each sample in the data package had an aliquot size associated with each result. No issues of this type were recognized and no qualifiers were assigned on this basis.

C. Dates of Sample Collection, Preparation, and Analysis (MARLAP 8.5.1.3)

The analytical data package should report date of sampling, preparation, and analysis. These data are used to calculate radiological holding times, some of which may be specified in the QAPP.

Discussion

Data was provided and the holding time requirements (i.e. <6 months) were met for every analysis in the data package. No issues of this type were recognized and no qualifiers were assigned on this basis.

D. Preservation (MARLAP 8.5.1.4)

Appropriate preservation is dependent upon analyte and matrix and should be defined in sampling and analysis documentation.

Discussion

The last page of each data package is the “Login Sample Receipt Checklist,” which describes the preservation state of samples. The lab reported that all samples were acceptably preserved by temperature or acidification.

No issues of this type were noted and no samples results were assigned qualifiers on this basis.

E. Tracking (MARLAP 8.5.1.5)

Each analytical result should be linked to the instrument or detector on which it was counted.

Discussion

Each analytical result in the data package was linked to a specific detector. Thus no issues of this type were recognized and no qualifiers were assigned on this basis.

F. Traceability (MARLAP 8.5.1.6)

The traceability of standards and reference materials to be used during the analysis should be specified in the QAPP.

Discussion

The QAPP did not provide specific requirements for traceability. However, there is documentation that all radioactive standards are directly or indirectly traceable to NIST. No qualifiers were assigned on this basis.

G. QC Types and Linkages (MARLAP 8.5.1.7)

The type and quantity of QC samples should be identified and listed in the SOW and the results provided by the laboratory in a summary report. Replicates and matrix spike results should be linked to the original sample results.

The information obtained from the analysis of laboratory-generated duplicates is useful to evaluate analytical variability and laboratory precision. Results from the analysis of laboratory generated duplicate samples can also

reflect the homogeneity or inhomogeneity of individual samples or groups of samples of the same matrices.

Discussion

There is one laboratory replicate pair for each analyte. In addition, results for method blanks, and a laboratory control standard were supplied for each analyte. There were laboratory control standards for each sample type and duplicate laboratory control standards for uranium and thorium by alpha spectroscopy. Matrix spikes or matrix spike duplicates were provided by for uranium and thorium by alpha spectroscopy. For each analyte there is a pair of field duplicates for a soil sample. There is also a rinse blank result for each analyte of interest. The QC types are clearly linked to the analytes and methods. Field replicates are clearly linked to analytes and methods. The field replicate pair reportedly consists of samples H001-SS005-0012-02 and H001-SS005-0012-01.

No qualifiers were assigned on this basis.

H. Chemical Separation (Yield) (MARLAP 8.5.1.8)

Yield assesses the effects of the sample matrix and the chemical separation steps on the analytical result and estimates the analyte loss throughout the total analytical process.

The evaluation of an analytical yield serves to evaluate the efficiency of radiochemical separations utilized when preparing samples for measurement or analysis. The use of a tracer is conducted when a known amount of a chemical tracer is added to unknown samples; during analysis, a yield or recovery of the tracer material is used to determine the efficiency of the entire analytical process. The tracer that is chosen is used because it mimics the properties of one or more target radionuclides.

Discussion

The analyses that employed a tracer include:

- Radium-226 and radium-228 by gas flow proportional counting. The tracer employed was barium-133.
- Isotopic thorium by alpha spectroscopy (thorium-229 tracer),
- Isotopic uranium by alpha spectroscopy (uranium-232 tracer).

Isotopic thorium results for sample 160-13353-9 (Client sample no H001-SS008-0012-01) had a high recovery for thorium 229 tracer. All thorium results for this sample are qualified with a 'J'. The corresponding laboratory replicate '160-13353-9 DU' exhibited an acceptable tracer recovery.

Qualifiers were assigned as noted above.

I. Self-Absorption (MARLAP 8.5.1.9)

For some radiochemical analytical methods, the SOW may specify the generation of a self-absorption curve, which correlates mass of sample deposited in a known geometry to detector efficiency.

Discussion

The laboratory employed self-absorption corrections in determination of radium-226 and radium-228 by gas flow proportional counting (GFPC). Mass absorption curves are provided on pages 627 and 628 of package 160-13353-2.

No qualifiers were assigned on this basis.

J. Efficiency, Calibration Curves, and Instrument Background (MARLAP 8.5.1.10)

The determination of detector efficiency is a detailed process that is best checked during an audit of the laboratory's capabilities and is usually not part of the verification and validation process.

Discussion

Efficiency -Efficiency and self-absorption are accounted for with GFPC by a correction curve, which was addressed in the "Self-Absorption" section, above. Efficiency and energy calibration were checked daily, monthly and annually for alpha and gamma spectrometers.

Backgrounds – Daily, monthly and annual backgrounds are provided for alpha and gamma spectrometers as well as GFPC units. Energy calibration and background was determined daily for gamma spectrometers.

In general the background and detector response histories are well documented in the data packages. No issues of these types were recognized and no qualifiers were assigned on this basis.

K. Spectrometry Resolution (MARLAP 8.5.1.11)

The measured resolution of alpha and gamma spectrometers, and spectral information should be provided in the data package to evaluate if proper peak identification and separation was made.

Discussion

FWHM data are provided for the alpha spectroscopy results. There are no established acceptance criteria for alpha spectrometer resolution in the QAPP. Energy resolution was sufficient to allow resolution of the alpha emitting thorium or uranium isotopes of interest. The individual alpha spectra for samples and standards are provided.

FWHM data for gamma spectroscopy results are within 0.5%, which meets the requirements of the QAPP.

No issues with missing spectra or spectral resolution were recognized and no qualifiers were assigned on this basis.

L. Dilution and Correction Factors (MARLAP 8.5.1.12)

Samples for radiochemistry are usually not diluted. If required, dilution and correction factors (i.e., dry weight correction, ashed weight correction) should be provided in the data package so that the final calculations of all data affected by dilution factors can be recalculated and confirmed.

Discussion

The required information appears to be provided. It appears that dilution factors are given for samples, such as H001-SS008-0012-01 (isotopic thorium), when a dilution factor other than 1 is used (see page 1249 of data package 160-13353-1 as an example).

No issues with missing data of these types were recognized and no qualifiers were assigned on this basis.

M. Counts and Count Time (Duration) (MARLAP 8.5.1.13)

The count time for each sample, QC analysis, and instrument background should be recorded in the data package. The ability to detect radionuclides is directly related to the count time.

Discussion

Count times QC analyses and backgrounds are documented in the data package. Count times were essentially always sufficient for results to have the required MDC. No results were qualified with a “J” or “UJ” for this particular reason.

N. Result of Measurement, Uncertainty, Minimum Detectable Concentration, and Units (MARLAP 8.5.1.14)

The result of each measurement, its expanded measurement uncertainty, and the estimated sample- or analyte-specific MDC should be reported for each sample in the appropriate units.

Discussion

No issues with these factors were recognized and no qualifiers were assigned on this basis.

5. QUALITY CONTROL SAMPLES TECHNICAL REVIEW

A. Method Blanks (MARLAP 8.5.2.1)

The requirement for a method blank is usually established in the SOW and appropriate plan documents. Check to see if a method blank was analyzed and no detected concentration/activity found in the results. •

Discussion

Blank results were provided for every analyte in the data package.

Activity was detected in method blanks for soil and liquid as noted below. A value Det = ‘J’ means that the analyte was detected above the critical level in the method blank. If the Det column is blank for a media blank sample, then the analyte concentration was reported at a value that exceeded the Minimum Detectable Concentration (MDC).

Table. Method blanks having detected activity.

LAB SAMPLE ID	MATRIX	METHOD	ISOTOPE	CONC	UNITS	Det
MB 160-206022/1-A	SO	A-01-R	Thorium-230	0.1	pCi/g	
MB 160-206022/1-A	SO	A-01-R	Thorium-228	0.04	pCi/g	J
MB 160-206043/1-A	LI	A-01-R	Thorium-230	0.14	pCi/L	
MB 160-206049/1-A	LI	9315	Radium-226	0.05	pCi/L	J
MB 160-206251/1-A	SO	A-01-R	Uranium-233/234	0.03	pCi/g	J
MB 160-206988/1-A	SO	GA-01-R	Radium-228	0.11	pCi/g	J
MB 160-207324/1-A	SO	A-01-R	Thorium-230	0.04	pCi/g	J

B. Laboratory Control Samples (MARLAP 8.5.2.2)

The objective of a Laboratory Control Standard (LCS) is to measure the response of the analytical process to a QC sample with a matrix similar to the sample. Check to see if an LCS was analyzed and within acceptable range.

Discussion

LCS samples were run for each batch and analysis type, and all LCS results were acceptable.

Laboratory control sample replicates of alpha spectroscopy samples showed acceptable performance as indicated below.

LCS SAMPLE	LCS SAMPLE DUP	MATRIX	ISOTOPE	RPctD (%)	DUPPLICATE ERROR RATIO
LCSD 160-206043/3-A	LCS 160-206043/2-A	LI	Thorium-230	3	0.34
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-233/234	11	1.32
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-235/236	14	0.48
LCSD 160-206044/3-A	LCS 160-206044/2-A	LI	Uranium-238	2	0.26

No issues of this type with Laboratory Control Samples were recognized and no qualifiers were assigned on this basis.

C. **Laboratory Replicates (MARLAP 8.5.2.3)**

The objective of replicate analyses is to measure laboratory precision based on each sample matrix. Check to see if laboratory replicate was analyzed and within control limits.

Discussion

The Duplicate error ratio (DER) for each laboratory replicate pair were less than 1.67, which is satisfactory. No results in this data package were qualified as more uncertain than usual (J) due to high DER values.

Lab replicates exhibited a high relative percent difference (RPctD) for cesium-137, as indicated below. Cesium-137 was not detected in the liquid sample or duplicate. In the soil sample, cesium-137 was detected above the critical level in one sample but not in the duplicate. The concentrations of cesium-137 were so low in the laboratory replicate pair that the RPctD value is not a useful statistic.

LabID	LabID_Du	MATRIX	Method	Analyte	RPctD (%)	DER
160-13353-10	160-13353-10 DU	LI	GA-01-R	Cesium-137	98	0.36
160-13353-9	160-13353-9 DU	SO	GA-01-R	Cesium-137	276	0.74

No qualifiers were assigned on the basis of laboratory replicate performance.

D. **Matrix Spikes and Matrix Spike Duplicates (MARLAP 8.5.2.4)**

Matrix spike samples provide information about the effect of each sample matrix on the preparation and measurement methodology. The test uncovers the possible existence of recovery problems, based on either a statistical test or a specified fixed control limit.

Discussion

Matrix spike duplicates are provided in the following table.

MS Sample	MS Dup Sample	Method	Isotope	matrix	Rel % Diff	DER
160-13353-5 MS	160-13353-5 MSD	A-01-R	Uranium-233/234	SO	7	0.84
160-13353-5 MS	160-13353-5 MSD	A-01-R	Thorium-230	SO	21	2.6
160-13353-5 MS	160-13353-5 MSD	A-01-R	Uranium-235/236	SO	0	0
160-13353-5 MS	160-13353-5 MSD	A-01-R	Uranium-238	SO	2	0.22

All matrix spike duplicates met the relative percent difference performance requirement of <40%. The duplicate

error ratio of samples 160-13353-5 MS and 160-13353-5 MSD are relatively high at 2.6, but there is no qualification criteria given in the QAPP based on DER.

Matrix spike data was provided for the following samples and analytes. Matrix spike performance was acceptable and no qualifiers were assigned on the basis of percent recovery of the matrix spike.

Sample	Spike Sample	MATRIX	Method	Analyte	Recovery%
160-13353-5	160-13353-5 MS	SO	A-01-R	Uranium-233/234	99
160-13353-5	160-13353-5 MS	SO	A-01-R	Thorium-230	85
160-13353-5	160-13353-5 MS	SO	A-01-R	Uranium-235/236	115
160-13353-5	160-13353-5 MS	SO	A-01-R	Uranium-238	98

6. TEST OF DETECTION AND UNUSUAL UNCERTAINTY EVALUATION

A. Detection (MARLAP 8.5.3.1)

An analyte is considered detected in a sample when the measured concentration exceeds the critical value. In instances where the analyte result was less than the critical value, a "U" qualifier was assigned to designate a result that was not detected. If the concentration of an analyte is between the MDC and the critical level, than a value of "J" is assigned. A value of "J" was also be assigned if the analyte is detected in the field blank and the concentration in the sample is less than 5 times the value in the field blank. A Q intermediate data qualifier was assigned if the sample is present at a concentration that was less than 0.82 times the two sigma total propagated uncertainty. Since the QAPP does not have precision criteria for analytical results, no sample was assigned a final data qualifier of Q.

Discussion

The following samples carry either a preliminary data qualifier or a final data qualifier.

CLIENT SAMPLE ID	LAB_SAMPLE_ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
H001-SS001-0012-01	160-13353-1	SO	A-01-R	Thorium-230	B+,	
H001-SS001-0012-01	160-13353-1	SO	A-01-R	Uranium-235/236	J	J
H001-SS002-0012-01	160-13353-2	SO	A-01-R	Thorium-230	B+,	
H001-SS002-0012-01	160-13353-2	SO	A-01-R	Uranium-233/234	B+,	
H001-SS002-0012-01	160-13353-2	SO	GA-01-R	Cesium-137	Q, U	U
H001-SS002-0012-01	160-13353-2	SO	GA-01-R	Radium-228	J	J
H001-SS003-0012-01	160-13353-3	SO	A-01-R	Thorium-228	B+,	
H001-SS003-0012-01	160-13353-3	SO	A-01-R	Thorium-230	B+,	
H001-SS003-0012-01	160-13353-3	SO	A-01-R	Uranium-233/234	B+,	
H001-SS003-0012-01	160-13353-3	SO	GA-01-R	Cesium-137	Q, U	U
H001-SS003-0012-01	160-13353-3	SO	GA-01-R	Radium-228	B+,	
H001-SS004-0012-01	160-13353-4	SO	A-01-R	Thorium-228	B+,	
H001-SS004-0012-01	160-13353-4	SO	A-01-R	Thorium-230	B+,	
H001-SS004-0012-01	160-13353-4	SO	A-01-R	Uranium-233/234	B+,	
H001-SS004-0012-01	160-13353-4	SO	A-01-R	Uranium-235/236	Q, J	J
H001-SS004-0012-01	160-13353-4	SO	GA-01-R	Cesium-137	Q, U	U
H001-SS004-0012-01	160-13353-4	SO	GA-01-R	Radium-228	B+,	
H001-SS005-0012-01	160-13353-5	SO	A-01-R	Thorium-228	B+,	
H001-SS005-0012-01	160-13353-5	SO	A-01-R	Thorium-230	B+,	
H001-SS005-0012-01	160-13353-5	SO	A-01-R	Uranium-233/234	B+,	

CLIENT SAMPLE ID	LAB_SAMPLE_ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
H001-SS005-0012-01	160-13353-5	SO	A-01-R	Uranium-235/236	Q, U	U
H001-SS005-0012-01	160-13353-5	SO	GA-01-R	Cesium-137	J	J
H001-SS005-0012-01	160-13353-5	SO	GA-01-R	Radium-228	B+,	
H001-SS005-0012-02	160-13353-6	SO	A-01-R	Thorium-228	B+,	
H001-SS005-0012-02	160-13353-6	SO	A-01-R	Thorium-230	B+,	
H001-SS005-0012-02	160-13353-6	SO	A-01-R	Uranium-233/234	B+,	
H001-SS005-0012-02	160-13353-6	SO	A-01-R	Uranium-235/236	Q, J	J
H001-SS005-0012-02	160-13353-6	SO	GA-01-R	Radium-228	B+,	
H001-SS006-0012-01	160-13353-7	SO	A-01-R	Thorium-228	B+,	
H001-SS006-0012-01	160-13353-7	SO	A-01-R	Thorium-230	B+,	
H001-SS006-0012-01	160-13353-7	SO	A-01-R	Uranium-233/234	B+,	
H001-SS006-0012-01	160-13353-7	SO	A-01-R	Uranium-235/236	J	J
H001-SS006-0012-01	160-13353-7	SO	GA-01-R	Radium-228	B+,	
H001-SS007-0618-01	160-13353-8	SO	A-01-R	Thorium-228	B+,	
H001-SS007-0618-01	160-13353-8	SO	A-01-R	Thorium-230	B+,	
H001-SS007-0618-01	160-13353-8	SO	A-01-R	Uranium-233/234	B+,	
H001-SS007-0618-01	160-13353-8	SO	A-01-R	Uranium-235/236	J	J
H001-SS007-0618-01	160-13353-8	SO	GA-01-R	Radium-228	B+,	
H001-SS008-0012-01	160-13353-9	SO	A-01-R	Thorium-228	B+, J	J
H001-SS008-0012-01	160-13353-9	SO	A-01-R	Thorium-230	B+, J	J
H001-SS008-0012-01	160-13353-9	SO	A-01-R	Thorium-232	J	J
H001-SS008-0012-01	160-13353-9	SO	A-01-R	Uranium-233/234	B+,	
H001-SS008-0012-01	160-13353-9	SO	GA-01-R	Cesium-137	Q, U	U
H001-SS008-0012-01	160-13353-9	SO	GA-01-R	Radium-228	B+,	
LABQC	MB 160-206049/1-A	LI	9315	Radium-226	J	J
LABQC	MB 160-206051/1-A	LI	9320	Radium-228	Q, U	U
LABQC	LCSD 160-206043/3-A	LI	A-01-R	Thorium-228	J	J
LABQC	MB 160-206043/1-A	LI	A-01-R	Thorium-228	Q, U	U
LABQC	MB 160-206022/1-A	SO	A-01-R	Thorium-228	J	J
LABQC	MB 160-207324/1-A	SO	A-01-R	Thorium-228	Q, U	U
LABQC	MB 160-207324/1-A	SO	A-01-R	Thorium-230	J	J
LABQC	MB 160-207324/1-A	SO	A-01-R	Thorium-232	Q, U	U
LABQC	LCSD 160-206043/3-A	LI	A-01-R	Thorium-232	Q, U	U
LABQC	MB 160-206043/1-A	LI	A-01-R	Thorium-232	Q, U	U
LABQC	MB 160-206022/1-A	SO	A-01-R	Thorium-232	Q, U	U
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-233/234	Q, U	U
LABQC	MB 160-206251/1-A	SO	A-01-R	Uranium-233/234	J	J
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-235/236	Q, U	U
LABQC	MB 160-206251/1-A	SO	A-01-R	Uranium-235/236	Q, U	U
LABQC	MB 160-206044/1-A	LI	A-01-R	Uranium-238	Q, U	U
LABQC	MB 160-206251/1-A	SO	A-01-R	Uranium-238	Q, U	U
LABQC	MB 160-206989/1-A	SO	GA-01-R	Cesium-137	Q, U	U
LABQC	MB 160-206509/1-A	LI	GA-01-R	Cesium-137	Q, U	U
LABQC	MB 160-206988/1-A	SO	GA-01-R	Cesium-137	Q, U	U
LABQC	MB 160-206498/1-A	SO	GA-01-R	Radium-226	Q, U	U
LABQC	MB 160-206493/1-A	SO	GA-01-R	Radium-226	Q, U	U
LABQC	MB 160-206989/1-A	SO	GA-01-R	Radium-228	Q, U	U

CLIENT SAMPLE ID	LAB_SAMPLE_ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
LABQC	MB 160-206988/1-A	SO	GA-01-R	Radium-228	J	J
RB-H-1508012	160-13353-10	LI	9315	Radium-226	B+, Q, U	U
RB-H-1508012	160-13353-10	LI	9320	Radium-228	Q, U	U
RB-H-1508012	160-13353-10	LI	A-01-R	Thorium-228	Q, U	U
RB-H-1508012	160-13353-10	LI	A-01-R	Thorium-230	B+,	
RB-H-1508012	160-13353-10	LI	A-01-R	Thorium-232	Q, U	U
RB-H-1508012	160-13353-10	LI	A-01-R	Uranium-233/234	Q, U	U
RB-H-1508012	160-13353-10	LI	A-01-R	Uranium-235/236	Q, U	U
RB-H-1508012	160-13353-10	LI	A-01-R	Uranium-238	Q, U	U
RB-H-1508012	160-13353-10	LI	GA-01-R	Cesium-137	Q, U	U
RB-H-1508012	160-13353-10 DU	LI	GA-01-R	Cesium-137	Q, U	U

Analytical results for radium-226 from gamma spectroscopy based on the 186 keV gamma photon suffered from interference from uranium-235 gamma emissions. These radium-226 results are judged to have a high bias and are less reliable than usual. Preliminary and final data qualifiers for these results are as follows:

CLIENT SAMPLE ID	LAB_SAMPLE_ID	MATRIX	METHOD	ISOTOPE	QUALIFIERS	FINAL QUALIFIERS
H001-SS004-0012-01	160-13353-4	SO	GA-01-R	Radium-226	J+	J+
H001-SS005-0012-01	160-13353-5	SO	GA-01-R	Radium-226	J+	J+
H001-SS001-0012-01	160-13353-1	SO	GA-01-R	Radium-226	J+	J+
H001-SS002-0012-01	160-13353-2	SO	GA-01-R	Radium-226	J+	J+
H001-SS003-0012-01	160-13353-3	SO	GA-01-R	Radium-226	J+	J+
H001-SS005-0012-02	160-13353-6	SO	GA-01-R	Radium-226	J+	J+
H001-SS006-0012-01	160-13353-7	SO	GA-01-R	Radium-226	J+	J+
H001-SS007-0618-01	160-13353-8	SO	GA-01-R	Radium-226	J+	J+
H001-SS008-0012-01	160-13353-9	SO	GA-01-R	Radium-226	J+	J+
H001-SS008-0012-01	160-13353-9 DU	SO	GA-01-R	Radium-226	J+	J+
LABQC	MB 160-206988/1-A	SO	GA-01-R	Radium-226	J+	J+
LABQC	MB 160-206989/1-A	SO	GA-01-R	Radium-226	J+	J+

B. Detection Capability (MARLAP 8.5.3.2)

If the project requires a certain detection capability, the requirement should be expressed as a required minimum detectable concentration (RMDC). A failure to meet the RMDC is more often an important issue when the analyte is not detected.

The RMDC is usually specified in the QAPP and is compared to the sample-specific MDC achieved by the method. Required detection limits are provided in the QAPP. Samples are qualified “UJ” where no activity was detected in a sample but the required detection limit was not attained.

Discussion

In general, only the samples that were analyzed for radium-226 by gamma spectroscopy using the 186 keV gamma photon had difficulty attaining the RL of 1 pCi/g. In practice this did not result in any samples being assigned a UJ qualifier because all of the reported results were substantially greater than 1 pCi/g.

C. Large or Unusual Uncertainty (MARLAP 8.5.3.3)

The reported combined standard uncertainty is compared to the maximum allowable standard uncertainty. Either absolute (in concentration units) or relative uncertainties (expressed as a percent) are used in the comparison, depending on the reported concentration.

Discussion

There was no specific requirement in the project QAPP for qualifying results based on maximum allowable uncertainty. Samples were assigned an intermediate qualifier ‘Q’ if the sample result was not statistically distinguishable from zero based on a one-tailed 95% confidence bound.

Samples were qualified as ‘J’ if activity was found in the blank and the sample result was less than 5 times the result in the blank, or if there was some other reason to conclude that the analytical result was biased high and more uncertain than usual. A ‘UJ’ qualifier was assigned if the analyte was not detected, but the required MDA was not attained. A number of specific problems also resulted in assignment of a J qualifier where results were more uncertain than usual.

7. DATA LIMITATIONS

This section provides an overview of the limitations of the data for each sample and for each analysis.

A. Data Qualifiers

Final Data qualifiers are codes placed on an analytical result that alert data users to the validator’s concern about the result.

none The analysis was performed and radioactivity was detected. The result is statistically positive at the 95% confidence level, above the critical level and above the MDC. The radionuclide is considered to be present in the sample.

U A normal, not detected (< critical value) result.

Q A reported combined standard uncertainty, which exceeds the project’s required method uncertainty. (In this report Q was only used as an intermediate or preliminary qualifier.)

J An unusually uncertain or estimated result.

R A rejected result: the problems (quantitative or qualitative) are so severe that the data cannot be used.

The data validator should be aware that a data qualifier or a set of qualifiers does not apply to all similar data. The data validator should incorporate the project MQOs into the testing and qualifying decision-making process.

During the data validation process the data validator may use additional qualifiers based on QC sample results and acceptance criteria. These qualifiers may be summarized as U, J, R, or Q in the final validation report. The final validation reports should also include a summary of QC sample performance for use by the data assessor.

S A result with a related spike result (laboratory control sample [LCS], matrix spike [MS] or matrix spike duplicate [MSD]) that is outside the control limit for recovery (%R); S+ or S- used to indicate high or low recovery.

P A result with an associated replicate result that exceeds the control limit.

B A result with associated blank result, which is outside the control limit, B+ or B-.used to indicate high or low results.

B. Summary of Qualified Data

Sample with qualified results are provided in section 6A of this report.

8. FIELD DUPLICATE PERFORMANCE

No criteria for field duplicates is given in the QAPP.

The relative percent difference (RPctD) and duplicate error ratio (DER) were calculated for the field duplicate pair of samples. This statistic potentially can provide indications of the uniformity of the analyte in the media sampled. The relatively large values of DER (greater than two or three) suggest that the distribution of contaminants in the media sampled was heterogeneous.

No qualifiers were assigned on the basis of field duplicate performance.

Table of Field Duplicates

ClientID	LabSampleID	ClientID_du	LabSampleID_du	Analyte	ANALYSIS METHOD	RPctD (%)	DER
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Uranium-233/234	A-01-R	22	1.2
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Thorium-230	A-01-R	8	0.58
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Thorium-228	A-01-R	3	0.24
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Uranium-235/236	A-01-R	60	0.62
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Thorium-232	A-01-R	4	0.3
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Uranium-238	A-01-R	4	0.22
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Cesium-137	GA-01-R	89	2.28
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	K-40	GA-01-R	11	0.94
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Bi-214	GA-01-R	1	0.04
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Tl-208	GA-01-R	28	1.3
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Pb-214	GA-01-R	9	0.54
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Pb-212	GA-01-R	2	0.1
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Radium-228	GA-01-R	48	2.04
H001-SS005-0012-02	160-13353-6	H001-SS005-0012-01	160-13353-5	Radium-226	GA-01-R	17	1.02

9. FIELD RINSE BLANKS

Ideally, the contaminants of interest should not be detected in the rinse blanks.

Discussion

Thorium-230 was detected in the field rinse blank RB-H-1508012 and also in the associated method blank. The concentration in the rinse blank was rather low (0.134 pCi/L). The medium of concern in this sampling campaign was soils, not water. A small amount of activity detected in a rinse blank is not likely to affect the analytical results for soil samples in a material way. No other samples were qualified due to thorium-230 activity detected in the rinse blank.

10. SUMMARY OF DATA USABILITY

There were a total of 10 radionuclide results associated with the field samples in this data package. The count of each final qualifier type for field samples is provided in the following table.

- Results that were statistically positive at the 95% confidence level and do not have other recognized problems are not flagged.
- Results that were statistically positive at the 95% confidence level and below the MDC were “J” flagged as estimated (having more uncertainty than usual).
- Results that were not detected, but had an MDC below the MDC that the QAPP required were qualified with a “U” validation flag.
- Results that were not detected, but had an MDC greater than the MDC that the QAPP required were qualified with a “UJ” validation flag.
- Results with severe problems (reported below zero with a high degree of statistical certainty in this case) were flagged as “R” and were rejected.

Table of the number of each of the various final data qualifiers.

FINAL QUALIFIERS	CountOfFINAL QUALIFIERS
	181
J	16
J+	12
U	32

The distribution of qualifiers among field samples is further broken down in the following table.

Table of counts of various qualifiers by counting technique.

METHOD	Description	FINAL QUALIFIERS	COUNT
9315	Separation and Gas Flow Proportional Counting (Alpha)		1
9315	Separation and Gas Flow Proportional Counting (Alpha)	J	1
9315	Separation and Gas Flow Proportional Counting (Alpha)	U	1
9320	Separation and Gas Flow Proportional Counting (Beta)		1
9320	Separation and Gas Flow Proportional Counting (Beta)	U	2
A-01-R	Chemical Separation and Alpha Spectroscopy		72
A-01-R	Chemical Separation and Alpha Spectroscopy	J	12
A-01-R	Chemical Separation and Alpha Spectroscopy	U	17
GA-01-R	Gamma Spectroscopy		107
GA-01-R	Gamma Spectroscopy	J	3
GA-01-R	Gamma Spectroscopy	J+	12
GA-01-R	Gamma Spectroscopy	U	12

11. REFERENCES

SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN. EPA CONTRACT NO: EP-S2-14-01, TDD NO: TO-0006-0064. DOCUMENT CONTROL NO: RST3-02-D-0037. August 2015.

Multi-Agency Radiological Laboratory Analytical Protocols Manual, Volume I, NUREG-1576, EPA 402-B-04-001A, NTIS PB2004-105421, July 2004.

12. Appended Documents

- Consolidated table of analytical results with qualifiers (11 pages).
- Radiological Data Verification/Validation Checklist (2 pages).
- Excerpts from Level IV Reports of Analysis, Chain of Custody, Narrative, Analytical Results (103 pages).

Holy Trinity Cemetery Site

DCN: RST3-02-F-006

Test America data packages 160-13352-2, 160-13352-1, and 160-13352-3

Data Package #

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
160-13353-1									
H001-SS001-0012-0									
A-01-R	Thorium-228	160-13353-1	SO	0.86	0.18	0.08			pCi/g
A-01-R	Thorium-230	160-13353-1	SO	1.06	0.21	0.02	B+,		pCi/g
A-01-R	Thorium-232	160-13353-1	SO	1.01	0.2	0.02			pCi/g
A-01-R	Uranium-233/234	160-13353-1	SO	0.83	0.18	0.07			pCi/g
A-01-R	Uranium-235/236	160-13353-1	SO	0.04	0.04	0.06	J	J	pCi/g
A-01-R	Uranium-238	160-13353-1	SO	0.9	0.19	0.05			pCi/g
H001-SS002-0012-0									
A-01-R	Thorium-228	160-13353-2	SO	0.69	0.17	0.1			pCi/g
A-01-R	Thorium-230	160-13353-2	SO	24	2.22	0.05	B+,		pCi/g
A-01-R	Thorium-232	160-13353-2	SO	0.8	0.18	0.04			pCi/g
A-01-R	Uranium-233/234	160-13353-2	SO	23.4	2.25	0.08	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-2	SO	0.94	0.26	0.08			pCi/g
A-01-R	Uranium-238	160-13353-2	SO	21.6	2.09	0.06			pCi/g
H001-SS003-0012-0									
A-01-R	Thorium-228	160-13353-3	SO	12.2	1.25	0.11	B+,		pCi/g
A-01-R	Thorium-230	160-13353-3	SO	7.46	0.84	0.08	B+,		pCi/g
A-01-R	Thorium-232	160-13353-3	SO	11.4	1.18	0.07			pCi/g
A-01-R	Uranium-233/234	160-13353-3	SO	7.1	0.79	0.05	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-3	SO	0.31	0.12	0.06			pCi/g
A-01-R	Uranium-238	160-13353-3	SO	7.55	0.83	0.06			pCi/g
H001-SS004-0012-0									

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Thorium-228	160-13353-4	SO	1.03	0.2	0.07	B+,		pCi/g
A-01-R	Thorium-230	160-13353-4	SO	0.84	0.18	0.02	B+,		pCi/g
A-01-R	Thorium-232	160-13353-4	SO	0.88	0.18	0.02			pCi/g
A-01-R	Uranium-233/234	160-13353-4	SO	0.77	0.18	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-4	SO	0.02	0.03	0.03	Q, J	J	pCi/g
A-01-R	Uranium-238	160-13353-4	SO	0.72	0.18	0.05			pCi/g
H001-SS005-0012-0									
A-01-R	Thorium-228	160-13353-5	SO	0.88	0.19	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13353-5	SO	1.04	0.2	0.06	B+,		pCi/g
A-01-R	Thorium-230	160-13353-5 MS	SO	4.47	0.52	0.07			pCi/g
A-01-R	Thorium-230	160-13353-5 MS	SO	5.54	0.64	0.07			pCi/g
A-01-R	Thorium-232	160-13353-5	SO	0.8	0.17	0.06			pCi/g
A-01-R	Uranium-233/234	160-13353-5 MS	SO	6.86	0.78	0.11			pCi/g
A-01-R	Uranium-233/234	160-13353-5 MS	SO	7.33	0.82	0.06			pCi/g
A-01-R	Uranium-233/234	160-13353-5	SO	0.58	0.15	0.08	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-5	SO	0.02	0.04	0.07	Q, U	U	pCi/g
A-01-R	Uranium-235/236	160-13353-5 MS	SO	0.35	0.14	0.07			pCi/g
A-01-R	Uranium-235/236	160-13353-5 MS	SO	0.35	0.14	0.08			pCi/g
A-01-R	Uranium-238	160-13353-5 MS	SO	7.1	0.8	0.1			pCi/g
A-01-R	Uranium-238	160-13353-5	SO	0.75	0.17	0.06			pCi/g
A-01-R	Uranium-238	160-13353-5 MS	SO	7.22	0.81	0.05			pCi/g
H001-SS005-0012-0									
A-01-R	Thorium-228	160-13353-6	SO	0.85	0.18	0.08	B+,		pCi/g
A-01-R	Thorium-230	160-13353-6	SO	0.96	0.19	0.08	B+,		pCi/g
A-01-R	Thorium-232	160-13353-6	SO	0.84	0.18	0.06			pCi/g
A-01-R	Uranium-233/234	160-13353-6	SO	0.72	0.18	0.08	B+,		pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-235/236	160-13353-6	SO	0.04	0.05	0.08	Q, J	J	pCi/g
A-01-R	Uranium-238	160-13353-6	SO	0.72	0.18	0.1			pCi/g
H001-SS006-0012-0									
A-01-R	Thorium-228	160-13353-7	SO	0.96	0.18	0.07	B+,		pCi/g
A-01-R	Thorium-230	160-13353-7	SO	1	0.19	0.06	B+,		pCi/g
A-01-R	Thorium-232	160-13353-7	SO	0.91	0.18	0.04			pCi/g
A-01-R	Uranium-233/234	160-13353-7	SO	0.88	0.2	0.07	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-7	SO	0.05	0.05	0.05	J	J	pCi/g
A-01-R	Uranium-238	160-13353-7	SO	0.8	0.18	0.03			pCi/g
H001-SS007-0618-0									
A-01-R	Thorium-228	160-13353-8	SO	0.92	0.19	0.06	B+,		pCi/g
A-01-R	Thorium-230	160-13353-8	SO	1.03	0.2	0.08	B+,		pCi/g
A-01-R	Thorium-232	160-13353-8	SO	0.93	0.19	0.02			pCi/g
A-01-R	Uranium-233/234	160-13353-8	SO	0.79	0.18	0.06	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-8	SO	0.03	0.04	0.03	J	J	pCi/g
A-01-R	Uranium-238	160-13353-8	SO	0.72	0.18	0.07			pCi/g
H001-SS008-0012-0									
A-01-R	Thorium-228	160-13353-9 DU	SO	35.18	4.34	0.69			pCi/g
A-01-R	Thorium-228	160-13353-9	SO	34.9	4.38	0.78	B+, J	J	pCi/g
A-01-R	Thorium-230	160-13353-9	SO	16.6	2.65	0.57	B+, J	J	pCi/g
A-01-R	Thorium-230	160-13353-9 DU	SO	16.49	2.58	0.44			pCi/g
A-01-R	Thorium-232	160-13353-9	SO	31.6	4.07	0.36	J	J	pCi/g
A-01-R	Thorium-232	160-13353-9 DU	SO	36.58	4.45	0.34			pCi/g
A-01-R	Uranium-233/234	160-13353-9	SO	12.6	1.27	0.08	B+,		pCi/g
A-01-R	Uranium-235/236	160-13353-9	SO	0.74	0.2	0.08			pCi/g
A-01-R	Uranium-238	160-13353-9	SO	13	1.3	0.07			pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL	
								QUALIFIER	UNITS
LABQC									
A-01-R	Thorium-228	LCSD 160-20604	LI	0.09	0.08	0.09	J	J	pCi/L
A-01-R	Thorium-228	MB 160-206043/	LI	0.01	0.04	0.1	Q, U	U	pCi/L
A-01-R	Thorium-228	MB 160-206022/	SO	0.04	0.04	0.05	J	J	pCi/g
A-01-R	Thorium-228	MB 160-207324/	SO	-0.01	0.01	0.06	Q, U	U	pCi/g
A-01-R	Thorium-230	MB 160-207324/	SO	0.04	0.05	0.08	J	J	pCi/g
A-01-R	Thorium-230	LCS 160-207324/	SO	24.86	2.42	0.11			pCi/g
A-01-R	Thorium-230	MB 160-206043/	LI	0.14	0.1	0.11			pCi/L
A-01-R	Thorium-230	LCS 160-206043/	LI	8.27	1.03	0.09			pCi/L
A-01-R	Thorium-230	LCS 160-206022/	SO	24.51	2.39	0.05			pCi/g
A-01-R	Thorium-230	LCSD 160-20604	LI	8.51	1.03	0.09			pCi/L
A-01-R	Thorium-230	MB 160-206022/	SO	0.1	0.06	0.05			pCi/g
A-01-R	Thorium-232	MB 160-207324/	SO	0	0.02	0.06	Q, U	U	pCi/g
A-01-R	Thorium-232	LCSD 160-20604	LI	0	0.01	0.08	Q, U	U	pCi/L
A-01-R	Thorium-232	MB 160-206022/	SO	0.01	0.02	0.03	Q, U	U	pCi/g
A-01-R	Thorium-232	MB 160-206043/	LI	0.01	0.04	0.1	Q, U	U	pCi/L
A-01-R	Uranium-233/234	LCSD 160-20604	LI	13.47	1.54	0.11			pCi/L
A-01-R	Uranium-233/234	MB 160-206044/	LI	0	0.01	0.08	Q, U	U	pCi/L
A-01-R	Uranium-233/234	MB 160-206251/	SO	0.03	0.04	0.06	J	J	pCi/g
A-01-R	Uranium-233/234	LCS 160-206251/	SO	6.15	0.69	0.06			pCi/g
A-01-R	Uranium-233/234	LCS 160-206044/	LI	12.1	1.41	0.12			pCi/L
A-01-R	Uranium-235/236	MB 160-206251/	SO	0	0.01	0.05	Q, U	U	pCi/g
A-01-R	Uranium-235/236	MB 160-206044/	LI	0	0.01	0.06	Q, U	U	pCi/L
A-01-R	Uranium-235/236	LCS 160-206251/	SO	0.3	0.12	0.06			pCi/g
A-01-R	Uranium-235/236	LCSD 160-20604	LI	0.59	0.25	0.12			pCi/L
A-01-R	Uranium-235/236	LCS 160-206044/	LI	0.68	0.27	0.12			pCi/L

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
A-01-R	Uranium-238	LCSD 160-20604	LI	13.03	1.5	0.06			pCi/L
A-01-R	Uranium-238	LCS 160-206044/	LI	12.76	1.47	0.06			pCi/L
A-01-R	Uranium-238	LCS 160-206251/	SO	6.51	0.72	0.05			pCi/g
A-01-R	Uranium-238	MB 160-206251/	SO	0.02	0.03	0.05 Q, U	U		pCi/g
A-01-R	Uranium-238	MB 160-206044/	LI	0	0.01	0.05 Q, U	U		pCi/L
GA-01-R	Americium-241	LCS 160-206509/	LI	13430	15500	435			pCi/L
GA-01-R	Cesium-137	LCS 160-206509/	LI	47620	4770	151			pCi/L
GA-01-R	Cesium-137	MB 160-206509/	LI	1.61	8.11	14.9 Q, U	U		pCi/L
GA-01-R	Cobalt-60	LCS 160-206509/	LI	46270	4580	119			pCi/L
RB-H-1508012									
A-01-R	Thorium-228	160-13353-10	LI	0.01	0.09	0.2 Q, U	U		pCi/L
A-01-R	Thorium-230	160-13353-10	LI	0.13	0.11	0.12 B+,			pCi/L
A-01-R	Thorium-232	160-13353-10	LI	0.03	0.05	0.1 Q, U	U		pCi/L
A-01-R	Uranium-233/234	160-13353-10	LI	0.04	0.07	0.12 Q, U	U		pCi/L
A-01-R	Uranium-235/236	160-13353-10	LI	0.02	0.05	0.11 Q, U	U		pCi/L
A-01-R	Uranium-238	160-13353-10	LI	-0.03	0.02	0.15 Q, U	U		pCi/L
GA-01-R	Cesium-137	160-13353-10	LI	0.96	6.03	11.2 Q, U	U		pCi/L
GA-01-R	Cesium-137	160-13353-10 D	LI	2.79	8.04	14.4 Q, U	U		pCi/L
160-13353-2									
H001-SS001-0012-0									
GA-01-R	Radium-226	160-13353-1	SO	1.05	0.31	0.23			pCi/g
H001-SS002-0012-0									
GA-01-R	Radium-226	160-13353-2	SO	35.5	3.8	0.4			pCi/g
H001-SS003-0012-0									
GA-01-R	Radium-226	160-13353-3	SO	77.7	8.35	1.19			pCi/g
H001-SS004-0012-0									

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Radium-226	160-13353-4	SO	0.94	0.27	0.2			pCi/g
H001-SS005-0012-0									
GA-01-R	Radium-226	160-13353-5	SO	1	0.24	0.18			pCi/g
H001-SS005-0012-0									
GA-01-R	Radium-226	160-13353-6	SO	0.84	0.2	0.15			pCi/g
H001-SS006-0012-0									
GA-01-R	Radium-226	160-13353-7	SO	1.23	0.32	0.24			pCi/g
H001-SS007-0618-0									
GA-01-R	Radium-226	160-13353-8	SO	0.9	0.22	0.14			pCi/g
H001-SS008-0012-0									
GA-01-R	Radium-226	160-13353-9 DU	SO	54.33	5.83	0.9			pCi/g
GA-01-R	Radium-226	160-13353-9	SO	54.1	5.93	1.22			pCi/g
LABQC									
9315	Radium-226	LCS 160-206049/	LI	12.61	1.24	0.12			pCi/L
9315	Radium-226	MB 160-206049/	LI	0.05	0.05	0.09 J	J		pCi/L
9320	Radium-228	LCS 160-206051/	LI	2.46	0.43	0.36			pCi/L
9320	Radium-228	MB 160-206051/	LI	-0.03	0.19	0.34 Q, U	U		pCi/L
GA-01-R	Americium-241	LCS 160-206498/	SO	98.29	10.3	1.27			pCi/g
GA-01-R	Americium-241	LCS 160-206493/	SO	97.53	10.2	1.17			pCi/g
GA-01-R	Cesium-137	LCS 160-206498/	SO	31.08	3.31	0.3			pCi/g
GA-01-R	Cesium-137	LCS 160-206493/	SO	30.36	3.23	0.26			pCi/g
GA-01-R	Cobalt-60	LCS 160-206493/	SO	19.06	1.96	0.1			pCi/g
GA-01-R	Cobalt-60	LCS 160-206498/	SO	19.09	1.97	0.11			pCi/g
GA-01-R	Radium-226	MB 160-206493/	SO	-0.06	1.11	0.16 Q, U	U		pCi/g
GA-01-R	Radium-226	MB 160-206498/	SO	0	0.08	0.17 Q, U	U		pCi/g

RB-H-1508012

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
9315	Radium-226	160-13353-10	LI	0.01	0.05	0.1	B+, Q, U	U	pCi/L
9320	Radium-228	160-13353-10	LI	-0.07	0.19	0.35	Q, U	U	pCi/L
160-13353-3									
H001-SS001-0012-0									
GA-01-R	Ac-228	160-13353-1	SO	1.38	0.36	0.27			pCi/g
GA-01-R	Bi-214	160-13353-1	SO	0.82	0.23	0.18			pCi/g
GA-01-R	Cesium-137	160-13353-1	SO	0.31	0.12	0.12			pCi/g
GA-01-R	K-40	160-13353-1	SO	18.1	3.41	2.01			pCi/g
GA-01-R	Pb-212	160-13353-1	SO	1.04	0.28	0.25			pCi/g
GA-01-R	Pb-214	160-13353-1	SO	0.89	0.2	0.18			pCi/g
GA-01-R	Radium-226	160-13353-1	SO	4.22	1.89	1.89	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-1	SO	1.38	0.36	0.27			pCi/g
GA-01-R	Tl-208	160-13353-1	SO	0.38	0.11	0.09			pCi/g
H001-SS002-0012-0									
GA-01-R	Bi-210	160-13353-2	SO	20	6.08	6.94			pCi/g
GA-01-R	Bi-214	160-13353-2	SO	36.4	3.91	0.42			pCi/g
GA-01-R	Cesium-137	160-13353-2	SO	-0.02	0.15	0.25	Q, U	U	pCi/g
GA-01-R	K-40	160-13353-2	SO	4.62	1.6	2.15			pCi/g
GA-01-R	Pb-210	160-13353-2	SO	20	6.08	6.94			pCi/g
GA-01-R	Pb-214	160-13353-2	SO	38.3	4.08	0.53			pCi/g
GA-01-R	Radium-226	160-13353-2	SO	82.5	15.8	6.35	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-2	SO	0.55	0.49	0.82	J	J	pCi/g
H001-SS003-0012-0									
GA-01-R	Ac-228	160-13353-3	SO	49	5.65	1.94			pCi/g
GA-01-R	Bi-212	160-13353-3	SO	57.4	9.91	6.72			pCi/g
GA-01-R	Bi-214	160-13353-3	SO	78.1	8.41	1.2			pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Cesium-137	160-13353-3	SO	0.16	0.44	0.74	Q, U	U	pCi/g
GA-01-R	K-40	160-13353-3	SO	18	5.35	4.75			pCi/g
GA-01-R	Pb-210	160-13353-3	SO	25	10.4	13.5			pCi/g
GA-01-R	Pb-212	160-13353-3	SO	48.2	6.4	1.2			pCi/g
GA-01-R	Pb-214	160-13353-3	SO	79	8.42	1.39			pCi/g
GA-01-R	Radium-226	160-13353-3	SO	175	33.9	15.1	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-3	SO	49	5.65	1.94	B+,		pCi/g
GA-01-R	Th-234	160-13353-3	SO	62.9	13.3	14.5			pCi/g
GA-01-R	Tl-208	160-13353-3	SO	16.5	1.86	0.6			pCi/g
H001-SS004-0012-0									
GA-01-R	Ac-228	160-13353-4	SO	1.39	0.36	0.28			pCi/g
GA-01-R	Bi-214	160-13353-4	SO	1.12	0.24	0.11			pCi/g
GA-01-R	Cesium-137	160-13353-4	SO	0.05	0.09	0.16	Q, U	U	pCi/g
GA-01-R	K-40	160-13353-4	SO	18.3	3.2	1.06			pCi/g
GA-01-R	Pb-212	160-13353-4	SO	1.19	0.25	0.18			pCi/g
GA-01-R	Pb-214	160-13353-4	SO	0.96	0.23	0.18			pCi/g
GA-01-R	Radium-226	160-13353-4	SO	4.87	2.05	1.88	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-4	SO	1.39	0.36	0.28	B+,		pCi/g
GA-01-R	Tl-208	160-13353-4	SO	0.42	0.12	0.1			pCi/g
H001-SS005-0012-0									
GA-01-R	Bi-214	160-13353-5	SO	0.71	0.22	0.2			pCi/g
GA-01-R	Cesium-137	160-13353-5	SO	0.1	0.07	0.1	J	J	pCi/g
GA-01-R	K-40	160-13353-5	SO	16.8	2.67	0.94			pCi/g
GA-01-R	Pb-212	160-13353-5	SO	0.96	0.21	0.15			pCi/g
GA-01-R	Pb-214	160-13353-5	SO	0.95	0.19	0.11			pCi/g
GA-01-R	Radium-226	160-13353-5	SO	2.56	1.04	1.2	J+	J+	pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Radium-228	160-13353-5	SO	0.58	0.25	0.32	B+,		pCi/g
GA-01-R	Tl-208	160-13353-5	SO	0.39	0.1	0.07			pCi/g
H001-SS005-0012-0									
GA-01-R	Ac-228	160-13353-6	SO	0.94	0.26	0.39			pCi/g
GA-01-R	Bi-214	160-13353-6	SO	0.72	0.2	0.17			pCi/g
GA-01-R	Cesium-137	160-13353-6	SO	0.25	0.12	0.1			pCi/g
GA-01-R	K-40	160-13353-6	SO	18.7	3.08	0.95			pCi/g
GA-01-R	Pb-212	160-13353-6	SO	0.95	0.24	0.22			pCi/g
GA-01-R	Pb-214	160-13353-6	SO	0.87	0.23	0.2			pCi/g
GA-01-R	Radium-226	160-13353-6	SO	3.05	1.47	1.66	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-6	SO	0.94	0.26	0.39	B+,		pCi/g
GA-01-R	Tl-208	160-13353-6	SO	0.29	0.1	0.1			pCi/g
H001-SS006-0012-0									
GA-01-R	Ac-228	160-13353-7	SO	1.25	0.34	0.32			pCi/g
GA-01-R	Bi-214	160-13353-7	SO	1.07	0.27	0.22			pCi/g
GA-01-R	Cesium-137	160-13353-7	SO	0.28	0.12	0.1			pCi/g
GA-01-R	K-40	160-13353-7	SO	16.1	2.97	2.05			pCi/g
GA-01-R	Pb-212	160-13353-7	SO	1.09	0.27	0.23			pCi/g
GA-01-R	Pb-214	160-13353-7	SO	1.05	0.24	0.24			pCi/g
GA-01-R	Radium-226	160-13353-7	SO	2.15	2.06	2.62	J+	J+	pCi/g
GA-01-R	Radium-228	160-13353-7	SO	1.25	0.34	0.32	B+,		pCi/g
GA-01-R	Tl-208	160-13353-7	SO	0.41	0.13	0.11			pCi/g
H001-SS007-0618-0									
GA-01-R	Ac-228	160-13353-8	SO	1.27	0.36	0.21			pCi/g
GA-01-R	Bi-214	160-13353-8	SO	0.87	0.27	0.23			pCi/g
GA-01-R	Cesium-137	160-13353-8	SO	0.18	0.08	0.1			pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	K-40	160-13353-8	SO	19.9	3.67	1.28			pCi/g
GA-01-R	Pb-212	160-13353-8	SO	1.23	0.31	0.25			pCi/g
GA-01-R	Pb-214	160-13353-8	SO	0.99	0.27	0.21			pCi/g
GA-01-R	Radium-226	160-13353-8	SO	2.16	1.38	2.11 J+	J+		pCi/g
GA-01-R	Radium-228	160-13353-8	SO	1.27	0.36	0.21 B+,			pCi/g
GA-01-R	Tl-208	160-13353-8	SO	0.37	0.13	0.11			pCi/g
H001-SS008-0012-0									
GA-01-R	Ac-228	160-13353-9	SO	65.3	6.99	1.42			pCi/g
GA-01-R	Ac-228	160-13353-9 DU	SO	65.08	6.79	1.15			pCi/g
GA-01-R	Bi-212	160-13353-9 DU	SO	69.9	8.91	4.41			pCi/g
GA-01-R	Bi-212	160-13353-9	SO	72.4	10.8	6.37			pCi/g
GA-01-R	Bi-214	160-13353-9 DU	SO	52.12	5.56	0.75			pCi/g
GA-01-R	Bi-214	160-13353-9	SO	52	5.61	0.96			pCi/g
GA-01-R	Cesium-137	160-13353-9	SO	-0.06	1.2	0.78 Q, U	U		pCi/g
GA-01-R	Cesium-137	160-13353-9 DU	SO	0.39	0.3	0.34			pCi/g
GA-01-R	Eu-155	160-13353-9 DU	SO	3.94	1.17	1.3			pCi/g
GA-01-R	K-40	160-13353-9 DU	SO	17.37	4.7	3.35			pCi/g
GA-01-R	K-40	160-13353-9	SO	13.9	4.27	3.6			pCi/g
GA-01-R	Pb-210	160-13353-9	SO	25	12.7	14.7			pCi/g
GA-01-R	Pb-210	160-13353-9 DU	SO	20.36	7.73	9.69			pCi/g
GA-01-R	Pb-212	160-13353-9	SO	66.9	8.75	1.09			pCi/g
GA-01-R	Pb-212	160-13353-9 DU	SO	67.43	8.81	1.01			pCi/g
GA-01-R	Pb-214	160-13353-9 DU	SO	56.06	5.95	0.99			pCi/g
GA-01-R	Pb-214	160-13353-9	SO	57.8	6.22	1.16			pCi/g
GA-01-R	Radium-226	160-13353-9 DU	SO	121.6	23.8	11 J+	J+		pCi/g
GA-01-R	Radium-226	160-13353-9	SO	127	25.2	12.4 J+	J+		pCi/g

Data Package

Client Sample I

METHOD	ISOTOPE	Lab Sample ID	MATRIX	Conc	2S	MDC	QUALIFIERS	FINAL QUALIFIER	UNITS
GA-01-R	Radium-228	160-13353-9	SO	65.3	6.99	1.42	B+,		pCi/g
GA-01-R	Radium-228	160-13353-9 DU	SO	65.08	6.79	1.15			pCi/g
GA-01-R	Th-234	160-13353-9	SO	41.9	10.1	11.9			pCi/g
GA-01-R	Th-234	160-13353-9 DU	SO	34.92	5.44	10.7			pCi/g
GA-01-R	Tl-208	160-13353-9 DU	SO	22.69	2.45	0.44			pCi/g
GA-01-R	Tl-208	160-13353-9	SO	23.2	2.54	0.56			pCi/g
LABQC									
GA-01-R	Americium-241	LCS 160-206988/	SO	100.8	10.6	1.2			pCi/g
GA-01-R	Americium-241	LCS 160-206989/	SO	101.2	10.7	1.29			pCi/g
GA-01-R	Cesium-137	MB 160-206989/	SO	0	0.01	0.06	Q, U	U	pCi/g
GA-01-R	Cesium-137	MB 160-206988/	SO	-0.01	0.06	0.1	Q, U	U	pCi/g
GA-01-R	Cesium-137	LCS 160-206989/	SO	30.01	3.25	0.42			pCi/g
GA-01-R	Cesium-137	LCS 160-206988/	SO	30.83	3.28	0.26			pCi/g
GA-01-R	Cobalt-60	LCS 160-206989/	SO	18.85	1.97	0.07			pCi/g
GA-01-R	Cobalt-60	LCS 160-206988/	SO	18.65	1.93	0.18			pCi/g
GA-01-R	Radium-226	MB 160-206988/	SO	-0.55	21.9	1.28	J+	J+	pCi/g
GA-01-R	Radium-226	MB 160-206989/	SO	-0.36	1.44	1.22	J+	J+	pCi/g
GA-01-R	Radium-228	MB 160-206988/	SO	0.11	0.11	0.16	J	J	pCi/g
GA-01-R	Radium-228	MB 160-206989/	SO	0.04	0.08	0.28	Q, U	U	pCi/g

Radiological Data Verification/Validation Checklist

Site Name: Holy Trinity Cemetery Site _____ Analytical Laboratory _____ TestAmerica Laboratories

Case Number _____ * Reviewer _____ Rick Haaker, CHP, CIH _____ Date _____ December 28, 2015 _____
R F Haaker

Part 1 - Sample Handling and Analysis Evaluation

MARLAP Ref.	Criteria	Yes	No	NA	Comments
8.5.1.1	Sample Descriptors - Each sample has a unique ID code which is cross-reference to unique Lab ID	X			
8.5.1.2	Aliquot Size - amount of sample used in analysis provided	X			
8.5.1.3	Dates of sample collection, sample prep and sample analysis provided	X			
8.5.1.4	Samples properly preserved	X			
8.5.1.5	Each analytical result linked to instrument/detector	X			
8.5.1.6	Traceability of standards and reference materials provided	X			
8.5.1.7	QC samples analyzed	X			
8.5.1.8	Yield (chemical separation, carrier and/or radiotracer) within acceptable ranges	X			Except where noted in validation report for one isotopic thorium.
8.5.1.9	Self-absorption curve provided	X			Curves provided for Ra-226 & Ra-228 by gas flow proportional counting.
8.5.1.10	Efficiency, calibration curves and instrument background information provided	X			
8.5.1.11	Spectrometry resolution data provided	X			
8.5.1.12	Dilution factors and corrections factors addressed and documentation provided.	X			Provided in data packages but not reviewed in detail by the validator.
8.5.1.13	Count Time for each sample, QC analysis and instrument background provided	X			
8.5.1.14	For each measurement: 1) Measurement uncertainty reported 2) Analyte MDC reported 3) Appropriate units used	X X X			

* Covers Test America Data Packages: 160-13352-1, 160-13352-2 & 160-13352-3

Part 2 - Quality Control

MARLAP Ref.	Criteria	Yes	No	NA	Comments
8.5.2.1	Method Blanks analyzed and no detected concentration/activity found		X		See section 5A of the validation report for detections in the method blanks.
8.5.2.2	Laboratory Control Samples analyzed and within acceptable ranges	X			
8.5.2.3	Laboratory replicates analyzed and within control limits	X			
8.5.2.4	Matrix Spikes/Matrix Spike Duplicate analyzed and within established criteria			X	Matrix spikes were analyzed. MS duplicates were or matrix spike duplicates were not required by the field sampling plan.
8.5.3.1	Test of detection information (critical value) provided.			X	The MDC was provided based on alpha = beta = 0.05. The critical value was not required by QAPP. The critical level can be approximated as 50% of the MDC. It can be calculated from the data provided in the package.
8.5.3.2	Detection Capability: Required Minimum Detectable Concentration (RMDC) less than the Minimum Detectable Concentration (MDC) for each analyte		X		The required MDC for radium-226 by gamma spectroscopy utilizing the 186 kev line did not meet the required detection limit of 1 pCi/g. This analysis was requested for a quick radium-226 estimate.
8.5.3.3	Uncertainty 1. Laboratory's combined standard uncertainty at concentrations lower than the action level less than required method uncertainty (expressed in concentration units) 2. Laboratory's relative combined standard uncertainty at concentrations above the action level less than required relative method uncertainty (express as a percent)			X X	No precision criteria was specified in the QAPP for individual analytical results.

Additional Comments: Detailed requirements other than RMDC not provided in the project sampling and analysis plan

ANALYTICAL REPORT

Job Number: 160-13353-1

Job Description: EPA RST2 - RFP No. 338

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly



Approved for release.
Rhonda E Ridenhower
Manager of Project Management
8/31/2015 11:50 AM

Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
08/31/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North, Earth City, MO 63045
Tel (314) 298-8566 Fax (314) 298-8757 www.testamericainc.com

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Definitions/ Glossary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP Nb. 338

TestAmerica Job ID 160-13353-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Doxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RFD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Doxin)
TEQ	Toxicity Equivalent Quotient (Doxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA RST2 - RFP No. 338

Report Number: 160-13353-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, with the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.□

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 08/14/2015; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 3.2° C, 4.5° C, 4.7° C and 5.3° C.

TOTAL METALS (ICP)-Solids

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 08/19/2015 and analyzed on 08/27/2015.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 160-206475 and analytical batch 160-208339 were outside control limits for antimony, potassium, and zinc. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. H001-SS005-0012-01 (160-13353-5[MS]) and H001-SS005-0012-01 (160-13353-5[MSD])

Due to the high concentration of aluminum, calcium, iron, magnesium, and manganese, the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 160-206475 and analytical batch 160-208339 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. H001-SS005-0012-01 (160-13353-5[MS]) and H001-SS005-0012-01 (160-13353-5[MSD])

The following samples from preparation batch 160-206475 and analytical batch 160-208339 were diluted to bring the concentration of target analytes within the calibration range: H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-01 (160-13353-5[MS]), H001-SS005-0012-01 (160-13353-5[MSD]), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8), H001-SS008-0012-01 (160-13353-9) and (160-13353-A-5-A SD). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL METALS (ICP)-Water

Sample RB-H-1508012 (160-13353-10) was analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 08/17/2015 and analyzed on 08/19/2015 and 08/21/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

MERCURY-Solids

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for mercury in accordance with EPA SW-846 Method 7471B. The samples were prepared and analyzed on 08/24/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

MERCURY-Water

Sample RB-H-1508012 (160-13353-10) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 08/20/2015 and analyzed on 08/21/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 08/20/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)-Solids

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 08/15/2015, prepared on 08/17/2015 and 08/24/2015 and analyzed on 08/20/2015 and 08/28/2015.

The samples contain rocks and are non homogeneous. H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9)

The thorium-229 tracer recovery is outside the upper control limit (110% for the following sample (160-13353-E-9-L; 134% due to matrix interferences (see NCM 66185). The LCS (laboratory control sample) has an acceptable spike recovery demonstrating acceptable sample preparation and instrument performance. The samples associated with the batch have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been qualified and reported. H001-SS008-0012-01 (160-13353-9), (LCS 160-207324/2-A), (MB 160-207324/1-A) and (160-13353-E-9-M DU).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)-Water

Sample RB-H-1508012 (160-13353-10) was analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE. The samples were prepared on 08/17/2015 and analyzed on 08/20/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)-Solids

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 08/15/2015, prepared on 08/17/2015 and analyzed on 08/20/2015.

The samples contain rocks and are non homogeneous. H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)-Water

Sample RB-H-1508012 (160-13353-10) was analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples

were prepared on 08/17/2015 and analyzed on 08/20/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CESIUM-137 & OTHER GAMMA EMITTERS (GS)-Water

Sample RB-H-1508012 (160-13353-10) was analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE. The samples were prepared and analyzed on 08/19/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID H001-SS001-0012-01

Date Collected: 08/12/15 09:37

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-1

Matrix: Solid

Percent Solids: 85.8

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DL Fac
Aluminum	16000		220	46	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Antimony	ND		11	3.4	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Arsenic	7.6 J		11	2.6	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Barium	95		54	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Beryllium	0.87 J		5.4	0.81	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Cadmium	ND		5.4	0.37	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Calcium	8500		2700	73	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Chromium	28		11	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Cobalt	15 J		54	1.6	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Copper	15 J		27	2.7	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Iron	31000		110	22	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Lead	31		11	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Magnesium	6300		1100	34	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Manganese	970		11	0.87	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Nickel	24 J		43	1.3	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Potassium	1200 J		5400	790	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Selenium	ND		16	2.2	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Silver	ND		11	0.76	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Sodium	ND		1100	83	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Thallium	ND		22	2.1	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Vanadium	37 J		54	5.5	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10
Zinc	81		54	6.1	mg/Kg	✉	08/19/15 10:32	08/27/15 16:56	10

Method: 7471B - Mercury (OAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DL Fac
Mercury	0.026	J	0.033	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 20:51	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	DL Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.864		0.171	0.185	1.00	0.0763	pG/g	08/17/15 10:01	08/20/15 20:44	1
Thorium-230	1.06		0.186	0.206	1.00	0.0244	pG/g	08/17/15 10:01	08/20/15 20:44	1
Thorium-232	1.01		0.181	0.200	1.00	0.0243	pG/g	08/17/15 10:01	08/20/15 20:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.1		30 - 110	08/17/15 10:01	08/20/15 20:44	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	DL Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.827		0.172	0.185	1.00	0.0657	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0381	U	0.0442	0.0444	1.00	0.0610	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.902		0.178	0.194	1.00	0.0540	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	83.4		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: H001-SS002-0012-01

Date Collected: 08/12/15 14:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-2

Matrix: Solid

Percent Solids: 90.7

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17000		200	42	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Antimony	ND		9.9	3.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Arsenic	5.7 J		9.9	2.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Barium	260		50	1.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Beryllium	0.99 J		5.0	0.74	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Cadmium	ND		5.0	0.34	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Calcium	84000		2500	67	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Chromium	48		9.9	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Cobalt	8.4 J		50	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Copper	27		25	2.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Iron	20000		99	20	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Lead	26		9.9	1.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Magnesium	9500		990	31	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Manganese	500		9.9	0.79	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Nickel	22 J		40	1.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Potassium	2500 J		5000	720	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Selenium	ND		15	2.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Silver	ND		9.9	0.69	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Sodium	400 J		990	76	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Thallium	ND		20	1.9	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Vanadium	35 J		50	5.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10
Zinc	81		50	5.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:00	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.026 J		0.033	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 20:53	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.690		0.163	0.173	1.00	0.101	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	24.0		0.923	2.22	1.00	0.0549	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.801		0.169	0.182	1.00	0.0427	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.1		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	23.4		1.09	2.25	1.00	0.0781	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.938		0.243	0.256	1.00	0.0760	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	21.6		1.04	2.09	1.00	0.0609	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	60.8		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: H001-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Percent Solids: 85.4

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		210	45	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Antimony	ND		11	3.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Arsenic	8.4 J		11	2.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Barium	120		53	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Beryllium	1.9 J		5.3	0.80	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Cadmium	1.6 J		5.3	0.36	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Calcium	87000		2700	72	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Chromium	240		11	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Cobalt	28 J		53	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Copper	53		27	2.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Iron	13000		110	21	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Lead	28		11	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Magnesium	33000		1100	34	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Manganese	840		11	0.85	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Nickel	25 J		43	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Potassium	1200 J		5300	770	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Selenium	ND		16	2.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Silver	ND		11	0.75	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Sodium	2400		1100	81	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Thallium	ND		21	2.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Vanadium	44 J		53	5.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10
Zinc	580		53	6.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:04	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.075		0.034	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 20:55	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	12.2		0.719	1.25	1.00	0.106	pG/g	08/17/15 10:01	08/20/15 20:44	1
Thorium-230	7.46		0.561	0.841	1.00	0.0787	pG/g	08/17/15 10:01	08/20/15 20:44	1
Thorium-232	11.4		0.691	1.18	1.00	0.0744	pG/g	08/17/15 10:01	08/20/15 20:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	72.5		30 - 110	08/17/15 10:01	08/20/15 20:44	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	7.10		0.520	0.792	1.00	0.0461	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.305		0.121	0.124	1.00	0.0574	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	7.55		0.536	0.830	1.00	0.0588	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	74.3		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID H001-SS004-0012-01

Date Collected: 08/12/15 11:08

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-4

Matrix: Solid

Percent Solids: 82.6

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	15000		220	47	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Antimony	ND		11	3.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Arsenic	8.6 J		11	2.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Barium	91		56	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Beryllium	ND		5.6	0.84	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Cadmium	ND		5.6	0.38	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Calcium	8100		2800	75	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Chromium	25		11	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Cobalt	14 J		56	1.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Copper	16 J		28	2.7	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Iron	26000		110	22	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Lead	32		11	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Magnesium	5300		1100	35	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Manganese	960		11	0.89	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Nickel	27 J		45	1.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Potassium	1500 J		5600	810	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Selenium	ND		17	2.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Silver	ND		11	0.78	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Sodium	ND		1100	85	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Thallium	ND		22	2.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Vanadium	27 J		56	5.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10
Zinc	84		56	6.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:08	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.066		0.035	0.012	mg/Kg	✉	08/24/15 14:05	08/24/15 20:57	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	1.03		0.182	0.201	1.00	0.0734	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	0.839		0.162	0.177	1.00	0.0235	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.881		0.166	0.182	1.00	0.0234	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	91.0		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.772		0.172	0.184	1.00	0.0703	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0233 U		0.0329	0.0330	1.00	0.0349	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.717		0.164	0.175	1.00	0.0452	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	74.1		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID H001-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-5

Matrix: Solid

Percent Solids: 86.7

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	13000		200	43	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Antimony	ND	F1	10	3.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Arsenic	5.1	J	10	2.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Barium	90		50	1.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Beryllium	ND		5.0	0.75	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Cadmium	ND		5.0	0.34	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Calcium	5500		2500	67	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Chromium	25		10	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Cobalt	13	J	50	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Copper	16	J	25	2.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Iron	21000		100	20	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Lead	27		10	1.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Magnesium	4700		1000	32	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Manganese	1100		10	0.80	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Nickel	22	J	40	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Potassium	1100	J F1	5000	720	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Selenium	ND		15	2.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Silver	ND		10	0.70	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Sodium	ND		1000	76	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Thallium	ND		20	1.9	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Vanadium	18	J	50	5.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10
Zinc	99	F1	50	5.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:12	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.073		0.033	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 20:58	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.881		0.171	0.187	1.00	0.0809	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	1.04		0.184	0.204	1.00	0.0600	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.801		0.161	0.174	1.00	0.0566	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	94.7		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.578		0.144	0.152	1.00	0.0797	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0238	U	0.0378	0.0378	1.00	0.0655	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.751		0.161	0.173	1.00	0.0637	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	88.3		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: H001-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Percent Solids: 88.2

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	10000		220	47	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Antimony	ND		11	3.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Arsenic	ND		11	2.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Barium	68		55	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Beryllium	ND		5.5	0.82	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Cadmium	ND		5.5	0.37	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Calcium	2800		2700	74	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Chromium	21		11	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Cobalt	12 J		55	1.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Copper	12 J		27	2.7	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Iron	16000		110	22	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Lead	22		11	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Magnesium	3100		1100	35	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Manganese	750		11	0.88	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Nickel	17 J		44	1.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Potassium	900 J		5500	790	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Selenium	ND		16	2.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Silver	ND		11	0.77	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Sodium	ND		1100	83	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Thallium	ND		22	2.1	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Vanadium	15 J		55	5.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10
Zinc	88		55	6.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:28	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.067		0.033	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 21:10	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.851		0.167	0.181	1.00	0.0808	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	0.959		0.176	0.193	1.00	0.0752	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.837		0.162	0.177	1.00	0.0553	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	97.3		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.720		0.169	0.179	1.00	0.0810	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0444 U		0.0545	0.0547	1.00	0.0841	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.723		0.172	0.182	1.00	0.105	pG/g	08/17/15 10:01	08/20/15 13:58	1
Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Uranium-232	78.7		30 - 110	08/17/15 10:01	08/20/15 13:58	1				

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID H001-SS006-0012-01

Date Collected: 08/12/15 11:00

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-7

Matrix: Solid

Percent Solids: 87.1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		210	46	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Antimony	ND		11	3.3	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Arsenic	5.4 J		11	2.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Barium	77		53	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Beryllium	ND		5.3	0.80	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Cadmium	ND		5.3	0.36	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Calcium	3600		2700	72	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Chromium	56		11	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Cobalt	12 J		53	1.5	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Copper	12 J		27	2.6	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Iron	24000		110	21	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Lead	23		11	1.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Magnesium	3900		1100	34	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Manganese	730		11	0.85	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Nickel	21 J		43	1.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Potassium	1000 J		5300	770	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Selenium	ND		16	2.2	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Silver	ND		11	0.75	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Sodium	ND		1100	81	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Thallium	ND		21	2.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Vanadium	24 J		53	5.4	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10
Zinc	70		53	6.0	mg/Kg	✉	08/19/15 10:32	08/27/15 17:32	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.067		0.035	0.012	mg/Kg	✉	08/24/15 14:05	08/24/15 21:12	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.965		0.165	0.184	1.00	0.0701	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	1.00		0.167	0.187	1.00	0.0599	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.912		0.157	0.175	1.00	0.0379	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	110		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.884		0.180	0.195	1.00	0.0707	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0532 U		0.0504	0.0506	1.00	0.0542	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.799		0.169	0.182	1.00	0.0269	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	79.7		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID H001-SS007-0618-01

Date Collected: 08/12/15 13:20

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-8

Matrix: Solid

Percent Solids: 88.8

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		210	45	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Antimony	ND		10	3.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Arsenic	5.4 J		10	2.5	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Barium	95		52	1.1	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Beryllium	ND		5.2	0.78	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Cadmium	ND		5.2	0.36	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Calcium	32000		2600	70	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Chromium	29		10	1.4	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Cobalt	17 J		52	1.5	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Copper	19 J		26	2.6	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Iron	24000		100	21	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Lead	19		10	1.3	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Magnesium	6300		1000	33	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Manganese	830		10	0.84	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Nickel	25 J		42	1.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Potassium	1200 J		5200	760	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Selenium	ND		16	2.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Silver	ND		10	0.73	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Sodium	85 J		1000	80	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Thallium	ND		21	2.0	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Vanadium	20 J		52	5.3	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10
Zinc	67		52	5.9	mg/Kg	✉	08/19/15 10:34	08/27/15 17:48	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	1.1		0.034	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 21:14	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.918		0.170	0.187	1.00	0.0555	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-230	1.03		0.183	0.202	1.00	0.0808	pG/g	08/17/15 10:01	08/20/15 14:03	1
Thorium-232	0.932		0.170	0.187	1.00	0.0233	pG/g	08/17/15 10:01	08/20/15 14:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	94.8		30 - 110	08/17/15 10:01	08/20/15 14:03	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.790		0.173	0.185	1.00	0.0621	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.0347		0.0401	0.0402	1.00	0.0347	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.719		0.165	0.176	1.00	0.0697	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	77.8		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: H001-SS008-0012-01

Date Collected: 08/12/15 12:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-9

Matrix: Solid

Percent Solids: 92.9

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		210	44	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Antimony	ND		10	3.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Arsenic	10		10	2.4	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Barium	170		51	1.1	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Beryllium	4.7 J		5.1	0.77	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Cadmium	ND		5.1	0.35	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Calcium	64000		2600	69	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Chromium	240		10	1.4	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Cobalt	110		51	1.5	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Copper	37		26	2.5	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Iron	9700		100	20	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Lead	140		10	1.3	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Magnesium	15000		1000	32	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Manganese	920		10	0.82	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Nickel	77		41	1.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Potassium	ND		5100	740	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Selenium	ND		15	2.1	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Silver	ND		10	0.72	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Sodium	290 J		1000	78	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Thallium	ND		21	2.0	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Vanadium	49 J		51	5.2	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10
Zinc	96		51	5.8	mg/Kg	✉	08/19/15 10:34	08/27/15 17:53	10

Method: 7471B - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.037		0.032	0.011	mg/Kg	✉	08/24/15 14:05	08/24/15 21:16	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Thorium-228	34.9		3.26	4.38	1.00	0.782	pG/g	08/24/15 09:54	08/28/15 11:59	1
Thorium-230	16.6		2.25	2.65	1.00	0.567	pG/g	08/24/15 09:54	08/28/15 11:59	1
Thorium-232	31.6		3.08	4.07	1.00	0.364	pG/g	08/24/15 09:54	08/28/15 11:59	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	134	X	30 - 110	08/24/15 09:54	08/28/15 11:59	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	Uncert.	Uncert.	Prepared	Analyzed	Dil Fac	
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	12.6		0.697	1.27	1.00	0.0816	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	0.739		0.190	0.200	1.00	0.0796	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	13.0		0.706	1.30	1.00	0.0680	pG/g	08/17/15 10:01	08/20/15 13:58	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	77.3		30 - 110	08/17/15 10:01	08/20/15 13:58	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: RB-H-1508012

Lab Sample ID: 160-13353-10

Date Collected: 08/12/15 14:30

Matrix: Water

Date Received: 08/14/15 13:25

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28	J B	200	22	ug/L	08/17/15 15:17	08/19/15 12:56		1
Antimony	ND		10	3.7	ug/L	08/17/15 15:17	08/19/15 12:56		1
Arsenic	1.8	J	10	1.8	ug/L	08/17/15 15:17	08/19/15 12:56		1
Barium	ND		50	2.1	ug/L	08/17/15 15:17	08/19/15 12:56		1
Beryllium	ND		5.0	0.28	ug/L	08/17/15 15:17	08/19/15 12:56		1
Cadmium	0.80	J	5.0	0.34	ug/L	08/17/15 15:17	08/19/15 12:56		1
Calcium	71	J	1000	54	ug/L	08/17/15 15:17	08/19/15 12:56		1
Chromium	ND		10	3.4	ug/L	08/17/15 15:17	08/21/15 08:01		1
Cobalt	ND		50	2.7	ug/L	08/17/15 15:17	08/19/15 12:56		1
Copper	3.6	J B	25	2.1	ug/L	08/17/15 15:17	08/19/15 12:56		1
Iron	ND		100	13	ug/L	08/17/15 15:17	08/19/15 12:56		1
Lead	1.7	J B	10	0.60	ug/L	08/17/15 15:17	08/19/15 12:56		1
Magnesium	ND		1000	51	ug/L	08/17/15 15:17	08/19/15 12:56		1
Manganese	ND		15	1.0	ug/L	08/17/15 15:17	08/19/15 12:56		1
Nickel	ND		40	2.6	ug/L	08/17/15 15:17	08/19/15 12:56		1
Potassium	ND		5000	460	ug/L	08/17/15 15:17	08/19/15 12:56		1
Selenium	ND		15	2.1	ug/L	08/17/15 15:17	08/19/15 12:56		1
Silver	ND		10	0.99	ug/L	08/17/15 15:17	08/19/15 12:56		1
Sodium	ND		1000	110	ug/L	08/17/15 15:17	08/19/15 12:56		1
Thallium	ND		20	2.4	ug/L	08/17/15 15:17	08/19/15 12:56		1
Vanadium	ND		50	4.4	ug/L	08/17/15 15:17	08/19/15 12:56		1
Zinc	ND		20	8.3	ug/L	08/17/15 15:17	08/21/15 08:01		1

Method: 7470A - Mercury (OVA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.060	ug/L	08/20/15 12:58	08/21/15 09:19		1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDL	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.00583	U	0.0929	0.0929	1.00	0.205	pG/L	08/17/15 11:51	08/20/15 14:07	1
Thorium-230	0.134		0.106	0.107	1.00	0.115	pG/L	08/17/15 11:51	08/20/15 14:07	1
Thorium-232	0.0278	U	0.0539	0.0540	1.00	0.104	pG/L	08/17/15 11:51	08/20/15 14:07	1

Tracer

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	76.3		30 - 110	08/17/15 11:51	08/20/15 14:07	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDL	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.0423	U	0.0672	0.0673	1.00	0.116	pG/L	08/17/15 11:51	08/20/15 14:10	1
Uranium-235/236	0.0176	U	0.0483	0.0483	1.00	0.113	pG/L	08/17/15 11:51	08/20/15 14:10	1
Uranium-238	-0.0329	U	0.0248	0.0250	1.00	0.148	pG/L	08/17/15 11:51	08/20/15 14:10	1

Tracer

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	79.7		30 - 110	08/17/15 11:51	08/20/15 14:10	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RPP No. 338

TestAmerica Job ID 160-13353-1

Client Sample ID: RB-H-1508012

Lab Sample ID: 160-13353-10
 Matrix: Water

Date Collected: 08/12/15 14:30
 Date Received: 08/14/15 13:25

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	0.959	U	6.03	6.03	20.0	11.2	pCi/L	08/19/15 13:48	08/19/15 18:01	1
<i>Other Detected Radionuclides</i>										
Other Detected Radionuclide	Result	Qualifier	Count	Total	Uncert.	(2σ+/-)	RL	MDC	Unit	Prepared Analyzed Dil Fac
		None							pCi/L	08/19/15 13:48 08/19/15 18:01 1

TestAmerica St. Louis

Default Detection Limits

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP)

Analyte	RL	MDL	Units	Method
Aluminum	20	4.3	mg/Kg	6010C
Aluminum	200	22	ug/L	6010C
Antimony	1.0	0.31	mg/Kg	6010C
Antimony	10	3.7	ug/L	6010C
Arsenic	1.0	0.24	mg/Kg	6010C
Arsenic	10	1.8	ug/L	6010C
Barium	5.0	0.11	mg/Kg	6010C
Barium	50	2.1	ug/L	6010C
Beryllium	0.50	0.075	mg/Kg	6010C
Beryllium	5.0	0.28	ug/L	6010C
Cadmium	0.50	0.034	mg/Kg	6010C
Cadmium	5.0	0.34	ug/L	6010C
Calcium	250	6.7	mg/Kg	6010C
Calcium	1000	54	ug/L	6010C
Chromium	1.0	0.14	mg/Kg	6010C
Chromium	10	3.4	ug/L	6010C
Cobalt	5.0	0.14	mg/Kg	6010C
Cobalt	50	2.7	ug/L	6010C
Copper	2.5	0.25	mg/Kg	6010C
Copper	25	2.1	ug/L	6010C
Iron	10	2.0	mg/Kg	6010C
Iron	100	13	ug/L	6010C
Lead	1.0	0.13	mg/Kg	6010C
Lead	10	0.60	ug/L	6010C
Magnesium	100	3.2	mg/Kg	6010C
Magnesium	1000	51	ug/L	6010C
Manganese	1.0	0.080	mg/Kg	6010C
Manganese	15	1.0	ug/L	6010C
Nickel	4.0	0.12	mg/Kg	6010C
Nickel	40	2.6	ug/L	6010C
Potassium	500	72	mg/Kg	6010C
Potassium	5000	460	ug/L	6010C
Selenium	1.5	0.21	mg/Kg	6010C
Selenium	15	2.1	ug/L	6010C
Silver	1.0	0.070	mg/Kg	6010C
Silver	10	0.99	ug/L	6010C
Sodium	100	7.6	mg/Kg	6010C
Sodium	1000	110	ug/L	6010C
Thallium	2.0	0.19	mg/Kg	6010C
Thallium	20	2.4	ug/L	6010C
Vanadium	5.0	0.51	mg/Kg	6010C
Vanadium	50	4.4	ug/L	6010C
Zinc	5.0	0.56	mg/Kg	6010C
Zinc	20	8.3	ug/L	6010C

Method: 7470A - Mercury (CVAA)

Analyte	RL	MDL	Units	Method
Mercury	0.20	0.060	ug/L	7470A

Method: 7471B - Mercury (CVAA)

TestAmerica St. Louis

Default Detection Limits

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 7471B - Mercury (CVAA)

Analyte	RL	MDL	Units	Method
Mercury	0.033	0.011	mg/Kg	7471B

TestAmerica St. Louis

Tracer/ Carrier Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Method: A01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/ NA

Lab Sample ID	Client Sample ID	Th-229 (30-110)
160-13353-1	H001-SS001-0012-01	88.1
160-13353-2	H001-SS002-0012-01	84.1
160-13353-3	H001-SS003-0012-01	72.5
160-13353-4	H001-SS004-0012-01	91.0
160-13353-5	H001-SS005-0012-01	94.7
160-13353-5 MS	H001-SS005-0012-01	99.0
160-13353-5 MSD	H001-SS005-0012-01	80.6
160-13353-6	H001-SS005-0012-02	97.3
160-13353-7	H001-SS006-0012-01	110
160-13353-8	H001-SS007-0618-01	94.8
160-13353-9	H001-SS008-0012-01	134 X
160-13353-9 DU	H001-SS008-0012-01	105
LCS 160-206022/2-A	Lab Control Sample	96.6
LCS 160-207324/2-A	Lab Control Sample	97.3
MB 160-206022/1-A	Method Blank	87.2
MB 160-207324/1-A	Method Blank	97.6

Percent Yield (Acceptance Limits)

Tracer/ Carrier Legend

Th-229 = Thorium-229

Method: A01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Water

Prep Type: Total/ NA

Lab Sample ID	Client Sample ID	Th-229 (30-110)
160-13353-10	RB-H-1508012	76.3
LCS 160-206043/2-A	Lab Control Sample	84.0
LCSD 160-206043/3-A	Lab Control Sample Dup	91.8
MB 160-206043/1-A	Method Blank	89.8

Percent Yield (Acceptance Limits)

Tracer/ Carrier Legend

Th-229 = Thorium-229

Method: A01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/ NA

Lab Sample ID	Client Sample ID	U-232 (30-110)
160-13353-1	H001-SS001-0012-01	83.4
160-13353-2	H001-SS002-0012-01	60.8
160-13353-3	H001-SS003-0012-01	74.3
160-13353-4	H001-SS004-0012-01	74.1
160-13353-5	H001-SS005-0012-01	88.3
160-13353-5 MS	H001-SS005-0012-01	79.8
160-13353-5 MSD	H001-SS005-0012-01	75.0
160-13353-6	H001-SS005-0012-02	78.7
160-13353-7	H001-SS006-0012-01	79.7
160-13353-8	H001-SS007-0618-01	77.8

Percent Yield (Acceptance Limits)

TestAmerica St. Louis

Tracer/ Carrier Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Method: A01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/ NA

Percent Yield (Acceptance Limits)		
Lab Sample ID	Client Sample ID	U-232 (30-110)
160-13353-9	H001-SS008-0012-01	77.3
LCS 160-206251/2-A	Lab Control Sample	87.0
MB 160-206251/1-A	Method Blank	86.9

Tracer/ Carrier Legend

U-232 = Uranium-232

Method: A01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Water

Prep Type: Total/ NA

Percent Yield (Acceptance Limits)		
Lab Sample ID	Client Sample ID	U-232 (30-110)
160-13353-10	RB-H-1508012	79.7
LCS 160-206044/2-A	Lab Control Sample	73.1
LCSD 160-206044/3-A	Lab Control Sample Dup	75.1
MB 160-206044/1-A	Method Blank	86.3

Tracer/ Carrier Legend

U-232 = Uranium-232

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 160-206067/ 1-A

Matrix: Water

Analysis Batch: 206636

Client Sample ID: Method Blank

Prep Type: Total/ NA

Prep Batch: 206067

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DL Fac
Aluminum		22.6	J		200	22	ug/L		08/17/15 15:17	08/19/15 12:15	1
Antimony		ND			10	3.7	ug/L		08/17/15 15:17	08/19/15 12:15	1
Arsenic		ND			10	1.8	ug/L		08/17/15 15:17	08/19/15 12:15	1
Barium		ND			50	2.1	ug/L		08/17/15 15:17	08/19/15 12:15	1
Beryllium		ND			5.0	0.28	ug/L		08/17/15 15:17	08/19/15 12:15	1
Cadmium		ND			5.0	0.34	ug/L		08/17/15 15:17	08/19/15 12:15	1
Calcium		ND			1000	54	ug/L		08/17/15 15:17	08/19/15 12:15	1
Cobalt		ND			50	2.7	ug/L		08/17/15 15:17	08/19/15 12:15	1
Copper		2.40	J		25	2.1	ug/L		08/17/15 15:17	08/19/15 12:15	1
Iron		ND			100	13	ug/L		08/17/15 15:17	08/19/15 12:15	1
Lead		0.600	J		10	0.60	ug/L		08/17/15 15:17	08/19/15 12:15	1
Magnesium		ND			1000	51	ug/L		08/17/15 15:17	08/19/15 12:15	1
Manganese		ND			15	1.0	ug/L		08/17/15 15:17	08/19/15 12:15	1
Nickel		ND			40	2.6	ug/L		08/17/15 15:17	08/19/15 12:15	1
Potassium		ND			5000	460	ug/L		08/17/15 15:17	08/19/15 12:15	1
Selenium		ND			15	2.1	ug/L		08/17/15 15:17	08/19/15 12:15	1
Silver		ND			10	0.99	ug/L		08/17/15 15:17	08/19/15 12:15	1
Sodium		ND			1000	110	ug/L		08/17/15 15:17	08/19/15 12:15	1
Thallium		ND			20	2.4	ug/L		08/17/15 15:17	08/19/15 12:15	1
Vanadium		ND			50	4.4	ug/L		08/17/15 15:17	08/19/15 12:15	1

Lab Sample ID: MB 160-206067/ 1-A

Matrix: Water

Analysis Batch: 207295

Client Sample ID: Method Blank

Prep Type: Total/ NA

Prep Batch: 206067

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DL Fac
Chromium		ND			10	3.4	ug/L		08/17/15 15:17	08/21/15 07:33	1
Zinc		ND			20	8.3	ug/L		08/17/15 15:17	08/21/15 07:33	1

Lab Sample ID: LCS 160-206067/ 2-A

Matrix: Water

Analysis Batch: 206636

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206067

Analyte	Spike	LCS			D	%Rec	Limits
		Added	Result	Qualifier			
Aluminum	10000	9120				91	80 - 120
Antimony	500	470				94	80 - 120
Arsenic	1000	887				89	80 - 120
Barium	1000	948				95	80 - 120
Beryllium	1000	924				92	80 - 120
Cadmium	1000	908				91	80 - 120
Calcium	10000	9990				100	80 - 120
Cobalt	1000	991				99	80 - 120
Copper	1000	955				96	80 - 120
Iron	10000	9330				93	80 - 120
Lead	1000	959				96	80 - 120
Magnesium	10000	8360				84	80 - 120
Manganese	1000	899				90	80 - 120
Nickel	1000	973				97	80 - 120

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 160-206067/ 2-A

Matrix: Water

Analysis Batch: 206636

Analyte	Spike	LCS		Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Potassium	10000	9250		ug/L		93	80 - 120
Selenium	500	457		ug/L		91	80 - 120
Silver	200	187		ug/L		94	80 - 120
Sodium	10000	9430		ug/L		94	80 - 120
Thallium	200	201		ug/L		101	80 - 120
Vanadium	1000	877		ug/L		88	80 - 120

Lab Sample ID: LCS 160-206067/ 2-A

Matrix: Water

Analysis Batch: 207295

Analyte	Spike	LCS		Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Chromium	1000	1010		ug/L		101	80 - 120
Zinc	1000	967		ug/L		97	80 - 120

Lab Sample ID: MB 160-206475/ 1-A

Matrix: Solid

Analysis Batch: 208339

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	DL Fac
	Result	Qualifier							
Aluminum	ND		20	4.2	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Antimony	ND		0.98	0.30	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Arsenic	ND		0.98	0.23	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Barium	ND		4.9	0.11	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Beryllium	ND		0.49	0.074	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Cadmium	ND		0.49	0.033	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Calcium	ND		250	6.6	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Chromium	ND		0.98	0.14	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Cobalt	ND		4.9	0.14	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Copper	ND		2.5	0.24	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Iron	ND		9.8	2.0	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Lead	ND		0.98	0.13	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Magnesium	ND		98	3.1	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Manganese	ND		0.98	0.079	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Nickel	ND		3.9	0.11	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Potassium	ND		490	71	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Selenium	0.216	J	1.5	0.20	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Silver	ND		0.98	0.069	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Sodium	ND		98	7.5	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Thallium	ND		2.0	0.19	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Vanadium	ND		4.9	0.50	mg/Kg	08/19/15 10:32	08/27/15 16:35		1
Zinc	ND		4.9	0.55	mg/Kg	08/19/15 10:32	08/27/15 16:35		1

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206067

Client Sample ID: Method Blank

Prep Type: Total/ NA

Prep Batch: 206475

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCSSRM 160-206475/ 2-A

Matrix: Solid

Analysis Batch: 208339

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206475

%Rec.

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	Limits
Aluminum	8060	6300		mg/Kg	78.1	39.5 - 160.0	
Antimony	94.0	46.2		mg/Kg	49.1	22.8 - 257.4	
Arsenic	113	104		mg/Kg	92.2	69.7 - 142.5	
Barium	155	143		mg/Kg	92.2	72.9 - 127.1	
Beryllium	109	101		mg/Kg	92.3	74.7 - 124.8	
Cadmium	67.5	63.5		mg/Kg	94.0	73.2 - 126.8	
Calcium	5850	5810		mg/Kg	99.3	73.7 - 126.5	
Chromium	164	161		mg/Kg	98.0	70.7 - 129.9	
Cobalt	100	100		mg/Kg	100.3	74.4 - 126.0	
Copper	128	122		mg/Kg	95.2	75.2 - 125.8	
Iron	15200	12300		mg/Kg	80.9	37.4 - 162.5	
Lead	90.1	87.1		mg/Kg	96.6	70.1 - 129.9	
Magnesium	2790	2550		mg/Kg	91.4	65.2 - 135.1	
Manganese	363	333		mg/Kg	91.7	75.8 - 124.5	
Nickel	89.3	90.1		mg/Kg	100.9	72.0 - 127.7	
Potassium	2770	2370		mg/Kg	85.7	61.7 - 138.3	
Selenium	156	142		mg/Kg	91.0	67.3 - 132.1	
Silver	52.6	52.1		mg/Kg	99.0	66.7 - 133.5	
Sodium	686	607		mg/Kg	88.5	55.8 - 144.2	
Thallium	116	115		mg/Kg	99.2	67.4 - 131.9	
Vanadium	73.0	62.5		mg/Kg	85.6	59.7 - 139.7	
Zinc	168	164		mg/Kg	97.4	69.0 - 131.5	

Lab Sample ID: 160-13353-5 MS

Matrix: Solid

Analysis Batch: 208339

Client Sample ID: HD01-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 206475

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Aluminum	13000		1130	19200	4	mg/Kg	⊗	581	75 - 125
Antimony	ND	F1	56.5	23.3	F1	mg/Kg	⊗	41	75 - 125
Arsenic	5.1	J	113	112		mg/Kg	⊗	95	75 - 125
Barium	90		113	199		mg/Kg	⊗	96	75 - 125

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 160-13353-5 NS

Matrix: Solid

Analysis Batch: 208339

Analyte	Sample	Sample	Spike	NS		Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Beryllium	ND		113	108		mg/Kg	⊗	96	75 - 125
Cadmium	ND		113	112		mg/Kg	⊗	99	75 - 125
Calcium	5500		1130	4860	4	mg/Kg	⊗	-59	75 - 125
Chromium	25		113	144		mg/Kg	⊗	105	75 - 125
Cobalt	13 J		113	133		mg/Kg	⊗	107	75 - 125
Copper	16 J		113	136		mg/Kg	⊗	106	75 - 125
Iron	21000		1130	22800	4	mg/Kg	⊗	129	75 - 125
Lead	27		113	142		mg/Kg	⊗	102	75 - 125
Magnesium	4700		1130	5480	4	mg/Kg	⊗	66	75 - 125
Manganese	1100		113	996	4	mg/Kg	⊗	-126	75 - 125
Nickel	22 J		113	140		mg/Kg	⊗	105	75 - 125
Potassium	1100 J F1		1130	3590	J F1	mg/Kg	⊗	221	75 - 125
Selenium	ND		56.5	53.6		mg/Kg	⊗	95	75 - 125
Silver	ND		22.6	22.1		mg/Kg	⊗	98	75 - 125
Sodium	ND		1130	1110		mg/Kg	⊗	99	75 - 125
Thallium	ND		22.6	22.8 J		mg/Kg	⊗	101	75 - 125
Vanadium	18 J		113	130		mg/Kg	⊗	99	75 - 125
Zinc	99 F1		113	222		mg/Kg	⊗	109	75 - 125

Lab Sample ID: 160-13353-5 MSD

Matrix: Solid

Analysis Batch: 208339

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Aluminum	13000		1110	22400	4	mg/Kg	⊗	875	75 - 125	15	30
Antimony	ND F1		55.6	25.9 F1		mg/Kg	⊗	47	75 - 125	11	30
Arsenic	5.1 J		111	119		mg/Kg	⊗	102	75 - 125	6	30
Barium	90		111	218		mg/Kg	⊗	115	75 - 125	9	30
Beryllium	ND		111	114		mg/Kg	⊗	103	75 - 125	5	30
Cadmium	ND		111	117		mg/Kg	⊗	106	75 - 125	5	30
Calcium	5500		1110	5320	4	mg/Kg	⊗	-19	75 - 125	9	30
Chromium	25		111	156		mg/Kg	⊗	118	75 - 125	8	30
Cobalt	13 J		111	136		mg/Kg	⊗	111	75 - 125	2	30
Copper	16 J		111	140		mg/Kg	⊗	112	75 - 125	3	30
Iron	21000		1110	23900	4	mg/Kg	⊗	228	75 - 125	5	30
Lead	27		111	153		mg/Kg	⊗	114	75 - 125	8	30
Magnesium	4700		1110	6130	4	mg/Kg	⊗	125	75 - 125	11	30
Manganese	1100		111	824	4	mg/Kg	⊗	-284	75 - 125	19	30
Nickel	22 J		111	148		mg/Kg	⊗	114	75 - 125	6	30
Potassium	1100 J F1		1110	4110	J F1	mg/Kg	⊗	271	75 - 125	13	30
Selenium	ND		55.6	56.5		mg/Kg	⊗	102	75 - 125	5	30
Silver	ND		22.2	23.2		mg/Kg	⊗	104	75 - 125	5	30
Sodium	ND		1110	1180		mg/Kg	⊗	106	75 - 125	6	30
Thallium	ND		22.2	24.9		mg/Kg	⊗	112	75 - 125	9	30
Vanadium	18 J		111	142		mg/Kg	⊗	111	75 - 125	9	30
Zinc	99 F1		111	269 F1		mg/Kg	⊗	153	75 - 125	19	30

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LRC 160-206636/ 10

Matrix: Water

Analysis Batch: 206636

Client Sample ID Lab Control Sample

Analyte	Spike Added	LRC Result	LRC Qualifier	Unit	D	%Rec	%Rec.
							Limits
Aluminum	100000	99900		ug/L		100	90 - 110
Antimony	2000	2000		ug/L		100	90 - 110
Arsenic	10000	9950		ug/L		99	90 - 110
Barium	10000	9770		ug/L		98	90 - 110
Beryllium	10000	9750		ug/L		97	90 - 110
Cadmium	10000	9960		ug/L		100	90 - 110
Calcium	100000	99900		ug/L		100	90 - 110
Cobalt	10000	9920		ug/L		99	90 - 110
Copper	10000	9990		ug/L		100	90 - 110
Iron	100000	99300		ug/L		99	90 - 110
Lead	10000	9790		ug/L		98	90 - 110
Magnesium	100000	98500		ug/L		99	90 - 110
Manganese	10000	9720		ug/L		97	90 - 110
Nickel	10000	9850		ug/L		98	90 - 110
Potassium	100000	102000		ug/L		102	90 - 110
Selenium	2000	2050		ug/L		102	90 - 110
Silver	2000	1990		ug/L		99	90 - 110
Sodium	100000	101000		ug/L		101	90 - 110
Thallium	2000	1980		ug/L		99	90 - 110
Vanadium	10000	9850		ug/L		98	90 - 110

Lab Sample ID: LRC 160-207295/ 10

Matrix: Water

Analysis Batch: 207295

Client Sample ID Lab Control Sample

Analyte	Spike Added	LRC Result	LRC Qualifier	Unit	D	%Rec	%Rec.
							Limits
Chromium	10000	10100		ug/L		101	90 - 110
Zinc	10000	10000		ug/L		100	90 - 110

Lab Sample ID: LRC 160-208339/ 10

Matrix: Solid

Analysis Batch: 208339

Client Sample ID Lab Control Sample

Analyte	Spike Added	LRC Result	LRC Qualifier	Unit	D	%Rec	%Rec.
							Limits
Aluminum	100000	103000		ug/L		103	90 - 110
Antimony	2000	2180		ug/L		109	90 - 110
Arsenic	10000	10900		ug/L		109	90 - 110
Barium	10000	10200		ug/L		102	90 - 110
Beryllium	10000	10300		ug/L		103	90 - 110
Cadmium	10000	10900		ug/L		109	90 - 110
Calcium	100000	108000		ug/L		108	90 - 110
Chromium	10000	10700		ug/L		107	90 - 110
Cobalt	10000	10800		ug/L		108	90 - 110
Copper	10000	10900		ug/L		109	90 - 110
Iron	100000	103000		ug/L		103	90 - 110
Lead	10000	10800		ug/L		108	90 - 110
Magnesium	100000	104000		ug/L		104	90 - 110
Manganese	10000	10300		ug/L		103	90 - 110

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LRC 160-208339/ 10

Client Sample ID: Lab Control Sample

Matrix: Solid

Analysis Batch: 208339

Analyte	Spike	LRC	LRC	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				Limits
Nickel	10000	10800		ug/L	108	90 - 110	
Potassium	100000	104000		ug/L	104	90 - 110	
Selenium	2000	2170		ug/L	109	90 - 110	
Silver	2000	2150		ug/L	108	90 - 110	
Sodium	100000	103000		ug/L	103	90 - 110	
Thallium	2000	2140		ug/L	107	90 - 110	
Vanadium	10000	10200		ug/L	102	90 - 110	
Zinc	10000	10800		ug/L	108	90 - 110	

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 160-206284/ 1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206952

Prep Batch: 206284

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DI Fac
	Result	Qualifier									
Mercury	ND				0.20	0.060	ug/L		08/18/15 14:10	08/21/15 08:45	1

Lab Sample ID: LCS 160-206284/ 2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206952

Prep Batch: 206284

Analyte	Spike	LCS	LCS	Result	Qualifier	Unit	D	%Rec	Limits
	Added	Result	Qualifier						
Mercury	5.00	4.68				ug/L		94	80 - 120

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 160-207386/ 1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/ NA

Analysis Batch: 207680

Prep Batch: 207386

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	DI Fac
	Result	Qualifier									
Mercury	ND				0.029	0.0098	mg/Kg		08/24/15 14:05	08/24/15 20:47	1

Lab Sample ID: LCSSRM 160-207386/ 2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/ NA

Analysis Batch: 207680

Prep Batch: 207386

Analyte	Spike	LCSSRM	LCSSRM	Result	Qualifier	Unit	D	%Rec	Limits
	Added	Result	Qualifier						
Mercury	8.37	7.36				mg/Kg		87.9	51.3 - 148.

1

Lab Sample ID: 160-13353-5 MS

Client Sample ID: HD01-SS005-0012-01

Matrix: Solid

Prep Type: Total/ NA

Analysis Batch: 207680

Prep Batch: 207386

Analyte	Sample	Sample	Spike	MS	MS	Result	Qualifier	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier						
Mercury	0.073		0.903	0.977				mg/Kg	*	100	80 - 120

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: 160-13353-5 MSD

Matrix: Solid

Analysis Batch: 207680

Client Sample ID: H001-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 207386

%Rec.

RPD

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Mercury	0.073		0.925	0.965		mg/Kg	♂	96	80 - 120	1	30

Method: A01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-206022/ 1-A

Matrix: Solid

Analysis Batch: 206789

Client Sample ID: Method Bank

Prep Type: Total/ NA

Prep Batch: 206022

Analyte	MB		MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	DI Fac
	Result	Qualifier	Result	Qualifier	Uncert.	Uncert.						
Thorium-228	0.03808	U	0.0383		0.0384	1.00	0.0474	pG/g	08/17/15 10:01	08/20/15 14:02		1
Thorium-230	0.09842		0.0593		0.0598	1.00	0.0474	pG/g	08/17/15 10:01	08/20/15 14:02		1
Thorium-232	0.008425	U	0.0168		0.0169	1.00	0.0253	pG/g	08/17/15 10:01	08/20/15 14:02		1
Tracer	MB		MB		Limits		Prepared		Analyzed		DI Fac	
	%Yield	Qualifier	Result	Qualifier	Limits				Prepared	Analyzed		
Thorium-229	87.2				30 - 110				08/17/15 10:01	08/20/15 14:02		1

Lab Sample ID: LCS 160-206022/ 2-A

Matrix: Solid

Analysis Batch: 206790

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206022

Analyte	Spike		LCS		Total	Uncert.	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
	Added	Result	Result	Qual	Uncert.							
Thorium-230	24.5	24.51			2.39			1.00	0.0458	pG/g	100	81 - 118
Tracer	LCS		LCS		Limits		Prepared		Analyzed		DI Fac	
	%Yield	Qualifier	Result	Qualifier	Limits				Prepared	Analyzed		
Thorium-229	96.6				30 - 110				08/17/15 10:01	08/20/15 14:02		1

Lab Sample ID: 160-13353-5 MSD

Matrix: Solid

Analysis Batch: 206819

Client Sample ID: H001-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 206022

Analyte	Sample		Spike		Total	Uncert.	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
	Result	Qual	Added	Result	Qual							
Thorium-230	1.04		4.01	4.468		0.521		1.00	0.0727	pG/g	85	76 - 115
Tracer	MS		MS		Limits		Prepared		Analyzed		DI Fac	
	%Yield	Qualifier	Result	Qualifier	Limits				Prepared	Analyzed		
Thorium-229	99.0				30 - 110				08/17/15 10:01	08/20/15 14:02		1

Lab Sample ID: 160-13353-5 MSD

Matrix: Solid

Analysis Batch: 206820

Client Sample ID: H001-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 206022

Analyte	Sample		Spike		Total	Uncert.	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
	Result	Qual	Added	Result	Qual							
Thorium-230	1.04		3.98	5.538		0.641		1.00	0.0658	pG/g	113	76 - 115

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: A01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-13353-5 MSD

Client Sample ID: H001-SS005-0012-01

Matrix: Solid

Prep Type: Total/ NA

Analysis Batch: 206820

Prep Batch: 206022

Tracer	MSD		Limits
	%Yield	Qualifier	
Thorium-229	80.6		30 - 110

Lab Sample ID: MB 160-206043/ 1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206785

Prep Batch: 206043

Analyte	MB		Uncert.	Count		Total		Prepared	Analyzed	Dil Fac
	Result	Qualifier		(2σ+/-)	(2σ+/-)	RL	MDC	Unit		
Thorium-228	0.008984	U	0.0364	0.0365	1.00	0.0955	pG/L	08/17/15 11:51	08/20/15 14:07	1
Thorium-230	0.1427		0.105	0.105	1.00	0.107	pG/L	08/17/15 11:51	08/20/15 14:07	1
Thorium-232	0.008573	U	0.0364	0.0364	1.00	0.0960	pG/L	08/17/15 11:51	08/20/15 14:07	1

Tracer	MB		Uncert.	Count		Total		Prepared	Analyzed	Dil Fac
	%Yield	Qualifier		(2σ+/-)	(2σ+/-)	RL	MDC	Unit		
Thorium-229	89.8		30 - 110						08/17/15 11:51	08/20/15 14:07

Lab Sample ID: LCS 160-206043/ 2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206786

Prep Batch: 206043

Analyte	LCS		Uncert.	Spike		LCS		Total		%Rec.	Limits
	Added	Result		Result	Qual	(2σ+/-)	RL	MDC	Unit		
Thorium-230	8.03	8.266	1.03			1.03	1.00	0.0851	pG/L	103	81 - 125

Tracer	LCS		Uncert.	Spike		LCS		Total		%Rec.	Limits
	%Yield	Qualifier		Added	Result	Qual	(2σ+/-)	RL	MDC		
Thorium-229	84.0		30 - 110								

Lab Sample ID: LCSD 160-206043/ 3-A

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206787

Prep Batch: 206043

Analyte	LCSD		Uncert.	Spike		LCSD		Total		%Rec.	RER	Limit
	Added	Result		Result	Qual	(2σ+/-)	RL	MDC	Unit			
Thorium-230	8.03	8.508	1.03			1.03	1.00	0.0902	pG/L	106	81 - 125	0.12

Tracer	LCSD		Uncert.	Spike		LCSD		Total		%Rec.	RER	Limit
	%Yield	Qualifier		Added	Result	Qual	(2σ+/-)	RL	MDC			
Thorium-229	91.8		30 - 110									

Lab Sample ID: MB 160-207324/ 1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/ NA

Analysis Batch: 208071

Prep Batch: 207324

Analyte	MB		Uncert.	Count		Total		Prepared	Analyzed	Dil Fac
	Result	Qualifier		(2σ+/-)	(2σ+/-)	RL	MDC	Unit		
Thorium-228	-0.01315	U	0.0100	0.0101	1.00	0.0596	pG/g	08/24/15 09:54	08/26/15 14:14	1
Thorium-230	0.04187	U	0.0508	0.0509	1.00	0.0822	pG/g	08/24/15 09:54	08/26/15 14:14	1
Thorium-232	-0.003788	U	0.0178	0.0178	1.00	0.0569	pG/g	08/24/15 09:54	08/26/15 14:14	1

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: A01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-207324/ 1-A

Matrix: Solid

Analysis Batch: 208071

<i>Tracer</i>	<i>MB</i>	<i>MB</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>
Thorium-229			97.6		30 - 110

Client Sample ID: Method Blank
Prep Type: Total/ NA
Prep Batch: 207324

Lab Sample ID: LCS 160-207324/ 2-A

Matrix: Solid

Analysis Batch: 208072

<i>Analyte</i>	<i>LCS</i>	<i>LCS</i>	<i>Total</i>		<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>%Rec.</i>	<i>Limits</i>
			<i>Spike</i>	<i>Added</i>							
Thorium-230				24.5		24.86		2.42	1.00	0.108	pCi/g
Thorium-229			97.3		30 - 110					101	81 - 118

Client Sample ID: Lab Control Sample
Prep Type: Total/ NA
Prep Batch: 207324

Lab Sample ID: 160-13353-9 DU

Matrix: Solid

Analysis Batch: 208332

<i>Analyte</i>	<i>Sample</i>		<i>DU</i>		<i>Total</i>		<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>RER</i>	<i>Limit</i>	
	<i>Result</i>	<i>Qual</i>	<i>Result</i>	<i>Qual</i>	<i>Result</i>	<i>Qual</i>								
Thorium-228	34.9			35.18		4.34	1.00	0.686	pCi/g			0.04	1	
Thorium-230	16.6			16.49		2.58	1.00	0.442	pCi/g			0.03	1	
Thorium-232	31.6			36.58		4.45	1.00	0.343	pCi/g			0.58	1	
Thorium-229	105		30 - 110											

Client Sample ID: HD01-SS008-0012-01
Prep Type: Total/ NA
Prep Batch: 207324

Method: A01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-206044/ 1-A

Matrix: Water

Analysis Batch: 206783

<i>Analyte</i>	<i>MB</i>		<i>Count</i>		<i>Total</i>		<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>	
	<i>Result</i>	<i>MB</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>									
Uranium-233/234	-0.004355	U		0.00871	0.00872	1.00	0.0843	pCi/L	08/17/15 11:51	08/20/15 14:10			1		
Uranium-235/236	0.0000	U		0.0108	0.0108	1.00	0.0650	pCi/L	08/17/15 11:51	08/20/15 14:10			1		
Uranium-238	0.0000	U		0.00869	0.00869	1.00	0.0522	pCi/L	08/17/15 11:51	08/20/15 14:10			1		
Uranium-232	86.3		30 - 110										08/17/15 11:51	08/20/15 14:10	1

Client Sample ID: Method Blank
Prep Type: Total/ NA
Prep Batch: 206044

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-206044/ 2-A

Matrix: Water

Analysis Batch: 206781

Client Sample ID

Lab Control Sample
Prep Type: Total/ NA

Prep Batch: 206044

Analyte	Spike Added	LCS		Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.	
		Result	Qual						Limits	Limits
Uranium-233/234	12.7	12.10		1.41	1.00	0.122	pG/L	95	84 - 120	
Uranium-238	13.0	12.76		1.47	1.00	0.0589	pG/L	98	83 - 121	

Tracer	LCS		Limits
	%Yield	Qualifier	
Uranium-232	73.1		30 - 110

Lab Sample ID: LCSD 160-206044/ 3-A

Matrix: Water

Analysis Batch: 206784

Client Sample ID

Lab Control Sample
Prep Type: Total/ NA

Prep Batch: 206044

Analyte	Spike Added	LCSD		Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.		RER
		Result	Qual						Limits	RER	Limit
Uranium-233/234	12.7	13.47		1.54	1.00	0.112	pG/L	106	84 - 120	0.46	1
Uranium-238	13.0	13.03		1.50	1.00	0.0600	pG/L	100	83 - 121	0.09	1
Tracer	%Yield	Qualifier	Limits								
Uranium-232	75.1		30 - 110								

Lab Sample ID: MB 160-206251/ 1-A

Matrix: Solid

Analysis Batch: 206777

Client Sample ID

Method Blank
Prep Type: Total/ NA

Prep Batch: 206251

Analyte	Result	MB		Count Uncert. (2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
		MB	MB								
Uranium-233/234	0.03404	U		0.0390	0.0391	1.00	0.0568	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-235/236	-0.002647	U		0.00529	0.00530	1.00	0.0512	pG/g	08/17/15 10:01	08/20/15 13:58	1
Uranium-238	0.02123	U		0.0300	0.0301	1.00	0.0476	pG/g	08/17/15 10:01	08/20/15 13:58	1
Tracer	%Yield	Qualifier	Limits						Prepared	Analyzed	Dil Fac
Uranium-232	86.9		30 - 110						08/17/15 10:01	08/20/15 13:58	1

Lab Sample ID: LCS 160-206251/ 2-A

Matrix: Solid

Analysis Batch: 206778

Client Sample ID

Lab Control Sample
Prep Type: Total/ NA

Prep Batch: 206251

Analyte	Spike Added	LCS		Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.	
		Result	Qual						Limits	Limits
Uranium-233/234	6.37	6.150		0.694	1.00	0.0581	pG/g	97	84 - 120	
Uranium-238	6.51	6.513		0.725	1.00	0.0537	pG/g	100	82 - 122	
Tracer	%Yield	Qualifier	Limits							
Uranium-232	87.0		30 - 110							

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-13353-5 M6

Matrix: Solid

Analysis Batch: 206862

Client Sample ID: H001-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 206251

Analyte	Sample		Spike Added	M6		Uncert. (2σ+/-)	Total			%Rec.	Limits	
	Result	Qual		Result	Qual		RL	MDC	Unit			
Uranium-233/234	0.578		6.36	6.858		0.775	1.00	0.107	pCi/g	99	70 - 130	
Uranium-238	0.751		6.50	7.099		0.795	1.00	0.105	pCi/g	98	70 - 130	
MS MS												
Tracer	%Yield	Qualifier	Limits									
Uranium-232	79.8		30 - 110									

Lab Sample ID: 160-13353-5 MSD

Matrix: Solid

Analysis Batch: 206863

Client Sample ID: H001-SS005-0012-01

Prep Type: Total/ NA

Prep Batch: 206251

Analyte	Sample		Spike Added	MSD		Uncert. (2σ+/-)	Total			%Rec.	Limits	RER	Limit
	Result	Qual		Result	Qual		RL	MDC	Unit				
Uranium-233/234	0.578		6.31	7.332		0.818	1.00	0.0552	pCi/g	107	70 - 130	0.30	1
Uranium-238	0.751		6.45	7.221		0.807	1.00	0.0476	pCi/g	100	70 - 130	0.08	1
MSD MSD													
Tracer	%Yield	Qualifier	Limits										
Uranium-232	75.0		30 - 110										

Method: G-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-206509/ 1-A

Matrix: Water

Analysis Batch: 206440

Client Sample ID: Method Blank

Prep Type: Total/ NA

Prep Batch: 206509

Analyte	MB		Count	MB		Uncert. (2σ+/-)	Uncert. (2σ+/-)	Total			Prepared	Analyzed	DI Fac	
	Result	Qualifier		Result	Qualifier			RL	MDC	Unit				
Cesium-137	1.614	U	8.11	8.11		20.0		14.9	pCi/L		08/19/15 13:48	08/19/15 18:05	1	
Count Total														
Other Detected Radionuclides	MB	MB	Count	MB	MB	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	DI Fac	
Other Detected Radionuclide	Result	Qualifier	None	(2σ+/-)	(2σ+/-)	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	pCi/L	08/19/15 13:48	08/19/15 18:05	1

Lab Sample ID: LCS 160-206509/ 2-A

Matrix: Water

Analysis Batch: 206442

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206509

Analyte	Spike		LCS	LCS		Uncert. (2σ+/-)	Total			%Rec.	Limits
	Added	Result		Result	Qual		RL	MDC	Unit		
Americium-241	137000	134300		15500			435	pCi/L		98	90 - 111
Cesium-137	48700	47620		4770		20.0	151	pCi/L		98	90 - 111
Cobalt-60	48400	46270		4580			119	pCi/L		96	89 - 110

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-13353-10 DU

Client Sample ID: RB-H-1508012

Matrix: Water

Prep Type: Total/ NA

Analysis Batch: 206481

Prep Batch: 206509

Analyte	Sample		DU		Total		RER	Limit
	Result	Qual	Result	Qual	Uncert.	(2σ+/-)		
Cesium-137	0.959	U	2.789	U	8.04	20.0	14.4	pCi/L
<i>Total</i>								
Other Detected Radionuclides	Sample		DU		Uncert.		RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit
Other Detected Radionuclide	None		None		pCi/L			

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Metals

Prep Batch: 206067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	3010A	
LCS 160-206067/2-A	Lab Control Sample	Total/ NA	Water	3010A	
NB 160-206067/1-A	Method Bank	Total/ NA	Water	3010A	

Prep Batch: 206284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	7470A	
LCS 160-206284/2-A	Lab Control Sample	Total/ NA	Water	7470A	
NB 160-206284/1-A	Method Bank	Total/ NA	Water	7470A	

Prep Batch: 206475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/ NA	Solid	3050B	
160-13353-2	H001-SS002-0012-01	Total/ NA	Solid	3050B	
160-13353-3	H001-SS003-0012-01	Total/ NA	Solid	3050B	
160-13353-4	H001-SS004-0012-01	Total/ NA	Solid	3050B	
160-13353-5	H001-SS005-0012-01	Total/ NA	Solid	3050B	
160-13353-5 M&S	H001-SS005-0012-01	Total/ NA	Solid	3050B	
160-13353-5 MED	H001-SS005-0012-01	Total/ NA	Solid	3050B	
160-13353-5 SD	H001-SS005-0012-01	Total/ NA	Solid	3050B	
160-13353-6	H001-SS005-0012-02	Total/ NA	Solid	3050B	
160-13353-7	H001-SS006-0012-01	Total/ NA	Solid	3050B	
160-13353-8	H001-SS007-0618-01	Total/ NA	Solid	3050B	
160-13353-9	H001-SS008-0012-01	Total/ NA	Solid	3050B	
LCSRMRM 160-206475/2-A	Lab Control Sample	Total/ NA	Solid	3050B	
NB 160-206475/1-A	Method Bank	Total/ NA	Solid	3050B	

Analysis Batch: 206636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	6010C	
CR 160-206636/7	DL		Water	6010C	
ICSA 160-206636/8	ICS		Water	6010C	
ICSA 160-206636/9	ICS		Water	6010C	
LCS 160-206067/2-A	Lab Control Sample	Total/ NA	Water	6010C	206067
LRC 160-206636/10	Lab Control Sample		Water	6010C	
NB 160-206067/1-A	Method Bank	Total/ NA	Water	6010C	206067

Analysis Batch: 206952

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	7470A	
LCS 160-206284/2-A	Lab Control Sample	Total/ NA	Water	7470A	
NB 160-206284/1-A	Method Bank	Total/ NA	Water	7470A	

Analysis Batch: 207295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	6010C	
CR 160-207295/7	DL		Water	6010C	
ICSA 160-207295/8	ICS		Water	6010C	
ICSA 160-207295/9	ICS		Water	6010C	
LCS 160-206067/2-A	Lab Control Sample	Total/ NA	Water	6010C	
LRC 160-207295/10	Lab Control Sample		Water	6010C	206067

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Metals (Continued)

Analysis Batch: 207295 (Continued)

Lab Sample ID NB 160-206067/ 1-A	Client Sample ID Method Bank	Prep Type Total/ NA	Matrix Water	Method 6010C	Prep Batch 206067
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Prep Batch: 207386

Lab Sample ID 160-13353-1 160-13353-2 160-13353-3 160-13353-4 160-13353-5 160-13353-5 MS 160-13353-5 MBD 160-13353-5 SD 160-13353-6 160-13353-7 160-13353-8 160-13353-9 LCSSRM 160-207386/ 2-A NB 160-207386/ 1-A	Client Sample ID H001-SS001-0012-01 H001-SS002-0012-01 H001-SS003-0012-01 H001-SS004-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-02 H001-SS006-0012-01 H001-SS007-0618-01 H001-SS008-0012-01 Lab Control Sample Method Bank	Prep Type Total/ NA Total/ NA	Matrix Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid	Method 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B	Prep Batch 207386

Analysis Batch: 207680

Lab Sample ID 160-13353-1 160-13353-2 160-13353-3 160-13353-4 160-13353-5 160-13353-5 MS 160-13353-5 MBD 160-13353-5 SD 160-13353-6 160-13353-7 160-13353-8 160-13353-9 LCSSRM 160-207386/ 2-A NB 160-207386/ 1-A	Client Sample ID H001-SS001-0012-01 H001-SS002-0012-01 H001-SS003-0012-01 H001-SS004-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-02 H001-SS006-0012-01 H001-SS007-0618-01 H001-SS008-0012-01 Lab Control Sample Method Bank	Prep Type Total/ NA Total/ NA	Matrix Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid	Method 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B 7471B	Prep Batch 207386

Analysis Batch: 208339

Lab Sample ID 160-13353-1 160-13353-2 160-13353-3 160-13353-4 160-13353-5 160-13353-5 MS 160-13353-5 MBD 160-13353-5 SD 160-13353-6 160-13353-7 160-13353-8 160-13353-9 CR 160-208339/ 7	Client Sample ID H001-SS001-0012-01 H001-SS002-0012-01 H001-SS003-0012-01 H001-SS004-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-01 H001-SS005-0012-02 H001-SS006-0012-01 H001-SS007-0618-01 H001-SS008-0012-01 DL	Prep Type Total/ NA Total/ NA	Matrix Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid Solid	Method 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C 6010C	Prep Batch 206475

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Metals (Continued)

Analysis Batch: 208339 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSA 160-208339/8	ICS		Solid	6010C	
LCSAB 160-208339/9	ICS		Solid	6010C	
LOSSRM 160-206475/2-A	Lab Control Sample	Total/NA	Solid	6010C	206475
LRC 160-208339/10	Lab Control Sample		Solid	6010C	
NB 160-206475/1-A	Method Blank	Total/NA	Solid	6010C	206475

General Chemistry

Analysis Batch: 206646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/NA	Solid	Mixture	
160-13353-2	H001-SS002-0012-01	Total/NA	Solid	Mixture	
160-13353-3	H001-SS003-0012-01	Total/NA	Solid	Mixture	
160-13353-4	H001-SS004-0012-01	Total/NA	Solid	Mixture	
160-13353-5	H001-SS005-0012-01	Total/NA	Solid	Mixture	
160-13353-6	H001-SS005-0012-02	Total/NA	Solid	Mixture	
160-13353-7	H001-SS006-0012-01	Total/NA	Solid	Mixture	
160-13353-8	H001-SS007-0618-01	Total/NA	Solid	Mixture	
160-13353-9	H001-SS008-0012-01	Total/NA	Solid	Mixture	

Rad

Leach Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-2	H001-SS002-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-3	H001-SS003-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-4	H001-SS004-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-5	H001-SS005-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-5 MS	H001-SS005-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-5 MED	H001-SS005-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-6	H001-SS005-0012-02	Total/NA	Solid	Dy and Gind	
160-13353-7	H001-SS006-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-8	H001-SS007-0618-01	Total/NA	Solid	Dy and Gind	
160-13353-9	H001-SS008-0012-01	Total/NA	Solid	Dy and Gind	
160-13353-9 DU	H001-SS008-0012-01	Total/NA	Solid	Dy and Gind	

Prep Batch: 206022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-2	H001-SS002-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-3	H001-SS003-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-4	H001-SS004-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-5	H001-SS005-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-5 MS	H001-SS005-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-5 MED	H001-SS005-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-6	H001-SS005-0012-02	Total/NA	Solid	ExtChrom	205721
160-13353-7	H001-SS006-0012-01	Total/NA	Solid	ExtChrom	205721
160-13353-8	H001-SS007-0618-01	Total/NA	Solid	ExtChrom	205721
LCS 160-206022/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Rad (Continued)

Prep Batch: 206022 (Continued)

Lab Sample ID NB 160-206022/ 1-A	Client Sample ID Method Bank	Prep Type Total/ NA	Matrix Solid	Method ExtChrom	Prep Batch
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Prep Batch: 206043

Lab Sample ID 160-13353-10	Client Sample ID RB-H 1508012	Prep Type Total/ NA	Matrix Water	Method ExtChrom	Prep Batch
LGS 160-206043/ 2-A	Lab Control Sample	Total/ NA	Water	ExtChrom	
LCSD 160-206043/ 3-A	Lab Control Sample Dup	Total/ NA	Water	ExtChrom	
NB 160-206043/ 1-A	Method Bank	Total/ NA	Water	ExtChrom	

Prep Batch: 206044

Lab Sample ID 160-13353-10	Client Sample ID RB-H 1508012	Prep Type Total/ NA	Matrix Water	Method ExtChrom	Prep Batch
LGS 160-206044/ 2-A	Lab Control Sample	Total/ NA	Water	ExtChrom	
LCSD 160-206044/ 3-A	Lab Control Sample Dup	Total/ NA	Water	ExtChrom	
NB 160-206044/ 1-A	Method Bank	Total/ NA	Water	ExtChrom	

Prep Batch: 206251

Lab Sample ID 160-13353-1	Client Sample ID H001-SS001-0012-01	Prep Type Total/ NA	Matrix Solid	Method ExtChrom	Prep Batch 205721
160-13353-2	H001-SS002-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-3	H001-SS003-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-4	H001-SS004-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-5	H001-SS005-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-5 MS	H001-SS005-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-5 MD	H001-SS005-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-6	H001-SS005-0012-02	Total/ NA	Solid	ExtChrom	205721
160-13353-7	H001-SS006-0012-01	Total/ NA	Solid	ExtChrom	205721
160-13353-8	H001-SS007-0618-01	Total/ NA	Solid	ExtChrom	205721
160-13353-9	H001-SS008-0012-01	Total/ NA	Solid	ExtChrom	205721
LGS 160-206251/ 2-A	Lab Control Sample	Total/ NA	Solid	ExtChrom	
NB 160-206251/ 1-A	Method Bank	Total/ NA	Solid	ExtChrom	

Prep Batch: 206509

Lab Sample ID 160-13353-10	Client Sample ID RB-H 1508012	Prep Type Total/ NA	Matrix Water	Method Fill_Geo-0	Prep Batch
160-13353-10 DU	RB-H 1508012	Total/ NA	Water	Fill_Geo-0	
LGS 160-206509/ 2-A	Lab Control Sample	Total/ NA	Water	Fill_Geo-0	
NB 160-206509/ 1-A	Method Bank	Total/ NA	Water	Fill_Geo-0	

Prep Batch: 207324

Lab Sample ID 160-13353-9	Client Sample ID H001-SS008-0012-01	Prep Type Total/ NA	Matrix Solid	Method ExtChrom	Prep Batch 205721
160-13353-9 DU	H001-SS008-0012-01	Total/ NA	Solid	ExtChrom	205721
LGS 160-207324/ 2-A	Lab Control Sample	Total/ NA	Solid	ExtChrom	
NB 160-207324/ 1-A	Method Bank	Total/ NA	Solid	ExtChrom	

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Client Sample ID: HD01-SS001-0012-01

Date Collected: 08/12/15 09:37

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-1

Matrix: Solid

Percent Solids: 85.8

Prep Type	Batch	Batch	Run	Dilution Factor	Batch	Prepared		Lab
	Type	Method			Number	or Analyzed	Analyst	
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 16:56	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 20:51	JLG	TAL SL
Total/NA	Analysis	Moisture			206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206856	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206817	08/20/15 20:44	CDH	TAL SL

Client Sample ID: HD01-SS002-0012-01

Date Collected: 08/12/15 14:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-2

Matrix: Solid

Percent Solids: 90.7

Prep Type	Batch	Batch	Run	Dilution Factor	Batch	Prepared		Lab
	Type	Method			Number	or Analyzed	Analyst	
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:00	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 20:53	JLG	TAL SL
Total/NA	Analysis	Moisture			206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206857	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206815	08/20/15 14:03	CDH	TAL SL

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Percent Solids: 85.4

Prep Type	Batch	Batch	Run	Dilution Factor	Batch	Prepared		Lab
	Type	Method			Number	or Analyzed	Analyst	
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:04	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 20:55	JLG	TAL SL
Total/NA	Analysis	Moisture			206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206859	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206818	08/20/15 20:44	CDH	TAL SL

Client Sample ID: HD01-SS004-0012-01

Date Collected: 08/12/15 11:08

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-4

Matrix: Solid

Percent Solids: 82.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:08	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 20:57	JLG	TAL SL
Total/NA	Analysis	Moisture		1	206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206860	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206817	08/20/15 14:03	CDH	TAL SL

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-5

Matrix: Solid

Percent Solids: 86.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:12	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 20:58	JLG	TAL SL
Total/NA	Analysis	Moisture		1	206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206861	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206817	08/20/15 14:03	CDH	TAL SL

Client Sample ID: HD01-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Percent Solids: 88.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Client Sample ID: HD01-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Percent Solids: 88.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010C		10	208339	08/27/15 17:28	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 21:10	JLG	TAL SL
Total/NA	Analysis	Moisture		1	206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206864	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206821	08/20/15 14:03	CDH	TAL SL

Client Sample ID: HD01-SS006-0012-01

Date Collected: 08/12/15 11:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-7

Matrix: Solid

Percent Solids: 87.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206475	08/19/15 10:32	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:32	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 21:12	JLG	TAL SL
Total/NA	Analysis	Moisture		1	206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206865	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206822	08/20/15 14:03	CDH	TAL SL

Client Sample ID: HD01-SS007-0618-01

Date Collected: 08/12/15 13:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-8

Matrix: Solid

Percent Solids: 88.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206475	08/19/15 10:34	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:48	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 21:14	JLG	TAL SL
Total/NA	Analysis	Moisture		1	206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206866	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206022	08/17/15 10:01	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	206823	08/20/15 14:03	CDH	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Client Sample ID: HD01-SS008-0012-01

Date Collected: 08/12/15 12:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-9

Matrix: Solid

Percent Solids: 92.9

Prep Type	Batch	Batch	Run	Dilution Factor	Batch	Prepared	Analyst	Lab
	Type	Method			Number	or Analyzed		
Total/NA	Prep	3050B			206475	08/19/15 10:34	DAS	TAL SL
Total/NA	Analysis	6010C		10	208339	08/27/15 17:53	MTS	TAL SL
Total/NA	Prep	7471B			207386	08/24/15 14:05	JLG	TAL SL
Total/NA	Analysis	7471B		1	207680	08/24/15 21:16	JLG	TAL SL
Total/NA	Analysis	Moisture			206646	08/20/15 06:57	SDB	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			206251	08/17/15 10:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206867	08/20/15 13:58	CDH	TAL SL
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	ExtChrom			207324	08/24/15 09:54	SEK	TAL SL
Total/NA	Analysis	A-01-R		1	208599	08/28/15 11:59	RTM	TAL SL

Client Sample ID: RB-H-1508012

Date Collected: 08/12/15 14:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-10

Matrix: Water

Prep Type	Batch	Batch	Run	Dilution Factor	Batch	Prepared	Analyst	Lab
	Type	Method			Number	or Analyzed		
Total/NA	Prep	3010A			206067	08/17/15 15:17	DAS	TAL SL
Total/NA	Analysis	6010C		1	206636	08/19/15 12:56	MTS	TAL SL
Total/NA	Prep	3010A			206067	08/17/15 15:17	DAS	TAL SL
Total/NA	Analysis	6010C		1	207295	08/21/15 08:01	MTS	TAL SL
Total/NA	Prep	7470A			206284	08/20/15 12:58	JLG	TAL SL
Total/NA	Analysis	7470A		1	206952	08/21/15 09:19	JLG	TAL SL
Total/NA	Prep	ExtChrom			206043	08/17/15 11:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206828	08/20/15 14:07	CDH	TAL SL
Total/NA	Prep	ExtChrom			206044	08/17/15 11:51	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	206832	08/20/15 14:10	CDH	TAL SL
Total/NA	Prep	Fill_Geo-0			206509	08/19/15 13:48	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	206479	08/19/15 18:01	MFM	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

Certification Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Laboratory: TestAmerica St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
A 01-R	ExtChrom	Solid	Thorium-228
A 01-R	ExtChrom	Solid	Thorium-230
A 01-R	ExtChrom	Solid	Thorium-232
A 01-R	ExtChrom	Solid	Uranium-235/236
A 01-R	ExtChrom	Water	Thorium-228
A 01-R	ExtChrom	Water	Thorium-230
A 01-R	ExtChrom	Water	Thorium-232
A 01-R	ExtChrom	Water	Uranium-235/236
Misture		Solid	Percent Misture
Misture		Solid	Percent Solids
New Jersey	NELAP	2	M0002
			09-30-15 *

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
6010C	3010A	Water	Aluminum
6010C	3010A	Water	Antimony
6010C	3010A	Water	Arsenic
6010C	3010A	Water	Barium
6010C	3010A	Water	Beryllium
6010C	3010A	Water	Cadmium
6010C	3010A	Water	Calcium
6010C	3010A	Water	Chromium
6010C	3010A	Water	Cobalt
6010C	3010A	Water	Copper
6010C	3010A	Water	Iron
6010C	3010A	Water	Lead
6010C	3010A	Water	Magnesium
6010C	3010A	Water	Manganese
6010C	3010A	Water	Nickel
6010C	3010A	Water	Potassium
6010C	3010A	Water	Selenium
6010C	3010A	Water	Silver
6010C	3010A	Water	Sodium
6010C	3010A	Water	Thallium
6010C	3010A	Water	Vanadium
6010C	3010A	Water	Zinc
7470A	7470A	Water	Mercury
A 01-R	ExtChrom	Solid	Thorium-228
A 01-R	ExtChrom	Solid	Thorium-230
A 01-R	ExtChrom	Solid	Thorium-232
A 01-R	ExtChrom	Solid	Uranium-233/234
A 01-R	ExtChrom	Solid	Uranium-235/236
A 01-R	ExtChrom	Solid	Uranium-238
A 01-R	ExtChrom	Water	Thorium-228
A 01-R	ExtChrom	Water	Thorium-230
A 01-R	ExtChrom	Water	Thorium-232
A 01-R	ExtChrom	Water	Uranium-233/234

* Certification renewal pending - certification considered valid.

TestAmerica St. Louis

Certification Summary

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Laboratory: TestAmerica St. Louis (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
New Jersey	NELAP	2	M002	09-30-15 *

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
A-01-R	ExtChrom	Water	Uranium-235/238
A-01-R	ExtChrom	Water	Uranium-238
GA-01-R	Flame-Gas-O	Water	Cesium-137
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Certification renewal pending - certification considered valid.

TestAmerica St. Louis

Method Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SL
7470A	Mercury (CVAA)	SW846	TAL SL
7471B	Mercury (CVAA)	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13353-1	H001-SS001-0012-01	Solid	08/12/15 09:37	08/14/15 13:25
160-13353-2	H001-SS002-0012-01	Solid	08/12/15 14:20	08/14/15 13:25
160-13353-3	H001-SS003-0012-01	Solid	08/12/15 11:45	08/14/15 13:25
160-13353-4	H001-SS004-0012-01	Solid	08/12/15 11:08	08/14/15 13:25
160-13353-5	H001-SS005-0012-01	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-6	H001-SS005-0012-02	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-7	H001-SS006-0012-01	Solid	08/12/15 11:00	08/14/15 13:25
160-13353-8	H001-SS007-0618-01	Solid	08/12/15 13:20	08/14/15 13:25
160-13353-9	H001-SS008-0012-01	Solid	08/12/15 12:20	08/14/15 13:25
160-13353-10	RB-H 1508012	Water	08/12/15 14:30	08/14/15 13:25

TestAmerica St. Louis

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis

Job No.: 160-13353-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent			Concentration
					Reagent ID	Volume Added	Analyte	
1L Marn_00002	03/02/16		Eckert & Ziegler, Lot 83924-334		(Purchased Reagent)		Americium-241 Ce-139 Cesium-137 Co-57 Cobalt-60 Mn-54 Sn-113 Y-88	5097.5 pCi/L 2399.2 pCi/L 2003.5 pCi/L 1564.3 pCi/L 3293.9 pCi/L 3083.6 pCi/L 4248.4 pCi/L 6929.6 pCi/L
1L Marn_00003	02/09/17		Eckert & Ziegler, Lot 90062		(Purchased Reagent)		Americium-241 Cd-109 Ce-139 Cesium-137 Co-57 Cobalt-60 Hg-203 Mn-54 Sn-113 Y-88	5072.4 Bq 72078 Bq 2418 Bq 2056.4 Bq 1593.5 Bq 3233.8 Bq 5155.9 Bq 3114.6 Bq 4253.1 Bq 7000 Bq
1L Marn_00010	11/23/15		Eckert & Ziegler, Lot 83924-334		(Purchased Reagent)		Americium-241 Cesium-137 Cobalt-60	305.85 dpm/g 120.21 dpm/g 197.61 dpm/g
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	7.281 Bq 7.137 Bq 7.63 Bq
82233-334_00001	06/03/60		Eckert & Ziegler, Lot 82233-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	5.114 Bq 6.064 Bq 4.95 Bq
82234-334_00001	06/02/60		Eckert & Ziegler, Lot 82234-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	5.652 Bq 5.936 Bq 5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	7.466 Bq 6.897 Bq 7.167 Bq
82236-334_00001	06/02/60		Eckert & Ziegler, Lot 82236-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	6.891 Bq 6.664 Bq 7.107 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	5.608 Bq 6.424 Bq 5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Americium-241 Pu-239 Thorium-230	8.298 Bq 7.163 Bq 6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Americium-241 Pu-239	6.638 Bq 6.797 Bq

Shipping and Receiving Documents

USEPA

Date Shipped: 8/13/2015

Carrier Name: FedEx

Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-173446-0001

Cooler #: 1

Lab: TestAmerica Laboratories, Inc. - St. Louis

Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
1	H001-SSC01-0012-01	Mercury	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Thorium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Uranium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Gamma Spectroscopy	Soil	8/12/2015	09:37	1	32 oz glass jar	4 C	N
	H001-SSC01-0012-01	TAL Metals	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
2	H001-SSC02-0012-01	TAL Metals	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Mercury	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Thorium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Uranium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Gamma Spectroscopy	Soil	8/12/2015	14:20	1	32 oz glass jar	4 C	N
3	H001-SSC03-0012-01	TAL Metals	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:45	1	32 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Uranium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Mercury	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Thorium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
4	H001-SSC04-0012-01	TAL Metals	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Mercury	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Isotopic Thorium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252			

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all sample containers	Joel Petty RST3	8/13/15 1900	Joe Clark TA STC	8-14-15 1325	



160-13353 Chain of Custody

USEPA

Date Shipped: 8/13/2015

Carrier Name: FedEx

Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-173446-0001

Cooler #: 1

Lab: TestAmerica Laboratories, Inc. - St. Louis

Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS004-0012-01	Isotopic Uranium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SS004-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:08	1	32 oz glass jar	4 C	N
5	H001-SS005-0012-01	Isotopic Uranium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	TAL Metals	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	Gamma Spectroscopy	Soil	8/12/2015	10:28	2	32 oz glass jar	4 C	Y
	H001-SS005-0012-01	Isotopic Thorium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
6	H001-SS005-0012-01	Mercury	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-02	Gamma Spectroscopy	Soil	8/12/2015	10:28	1	32 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Uranium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Thorium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Mercury	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	TAL Metals	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
7	H001-SS006-0012-01	TAL Metals	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Mercury	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Thorium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Uranium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:00	1	32 oz glass jar	4 C	N
8	H001-SS007-0618-01	Isotopic Thorium	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #		

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbarly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
All samples	Joel Petty BST3	8/13/15 10:00	Joel Clark TAST2	8-14-15 1325	

USEPA
Date Shipped: 8/13/2015
Carrier Name: FedEx

Airbill No: 8037 9862 5956

CHAIN OF CUSTODY-RECORD

Case #: 338

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-173446-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS007-0618-01	Isotopic Uranium	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	Mercury	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	TAL Metals	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	Gamma Spectroscopy	Soil	8/12/2015	13:20	1	32 oz glass jar	4 C	N
Q	H001-SS008-0012-01	Mercury	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Thorium	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Uranium	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Gamma Spectroscopy	Soil	8/12/2015	13:30	1	32 oz glass jar	4 C	N
	H001-SS008-0012-01	TAL Metals	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM		
CHAIN OF CUSTODY #		
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252		

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples	Joel Petty AST2	8/13/15 1:00	Jill Clark TA ST2	8-14-15 1325	

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9862 5955

CHAIN OF CUSTODY RECORD

Case #. 338

Contact Name: Joel Petty

Contact Phone: 732-570-1913

Nº: 3 08131E 17E18 0003

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St. - Inc.

LOUIS

Lab: TestAmerica Laboratories, Inc. - St. Louis

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-13353-1

Login Number: 13353

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

Job Number: 160-13353-2

Job Description: EPA RST2 - RFP No. 338

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly



Approved for release.
Rhonda E Ridenhower
Manager of Project Management
9/14/2015 2:05 PM

Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
09/14/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North, Earth City, MO 63045
Tel (314) 298-8566 Fax (314) 298-8757 www.testamericainc.com

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Definitions/ Glossary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP Nb. 338

TestAmerica Job ID 160-13353-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation **These commonly used abbreviations may or may not be present in this report.**

dw	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
QFL	Contains Free Liquid
QNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DFac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
NDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Doxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
REER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RFD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Doxin)
TEQ	Toxicity Equivalent Quotient (Doxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA RST2 - RFP No. 338

Report Number: 160-13353-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraint of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client. ☐

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 08/14/2015; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 3.2° C, 4.5° C, 4.7° C and 5.3° C.

RADIUM 226 (21 DAY INGROWTH)

Sample RB-H-1508012 (160-13353-10) was analyzed for Radium 226 (21 day ingrowth) in accordance with SW- 846 Method 9315. The samples were prepared on 08/17/2015 and analyzed on 09/09/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-228 (GFPC)

Sample RB-H-1508012 (160-13353-10) was analyzed for Radium-228 (GFPC) in accordance with SW-846 Method 9320. The samples were prepared on 08/17/2015 and analyzed on 09/02/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 08/15/2015, prepared on 08/19/2015 and analyzed on 09/09/2015.

The detection goal for radium-226 was not met for the following samples due to high activity: H001-SS003-0012-01 (160-13353-3) and H001-SS008-0012-01 (160-13353-9). Analytical results are reported with the detection limit achieved.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Client Sample ID: HD01-SS001-0012-01

Date Collected: 08/12/15 09:37
 Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	1.05		0.287	0.307	1.00	0.231	pCi/g	08/19/15 12:18	09/09/15 08:50	1

Client Sample ID: HD01-SS002-0012-01

Date Collected: 08/12/15 14:20
 Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	35.5		0.921	3.80	1.00	0.400	pCi/g	08/19/15 12:18	09/09/15 08:49	1

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45
 Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	77.7		2.13	8.35	1.00	1.19	pCi/g	08/19/15 12:36	09/09/15 07:01	1

Client Sample ID: HD01-SS004-0012-01

Date Collected: 08/12/15 11:08
 Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.941		0.253	0.271	1.00	0.203	pCi/g	08/19/15 12:36	09/09/15 07:42	1

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28
 Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-4

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.997		0.219	0.242	1.00	0.179	pCi/g	08/19/15 12:36	09/09/15 07:04	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Client Sample ID: HD01-SS005-0012-02

Lab Sample ID: 160-13353-6

Date Collected: 08/12/15 10:28

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			Uncert.	(2σ+/-)						
Radium-226	0.837		0.174	0.195	1.00	0.151	pCi/g	08/19/15 12:36	09/09/15 07:04	1

Client Sample ID: HD01-SS006-0012-01

Lab Sample ID: 160-13353-7

Date Collected: 08/12/15 11:00

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			Uncert.	(2σ+/-)						
Radium-226	1.23		0.296	0.322	1.00	0.237	pCi/g	08/19/15 12:36	09/09/15 07:07	1

Client Sample ID: HD01-SS007-0618-01

Lab Sample ID: 160-13353-8

Date Collected: 08/12/15 13:20

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			Uncert.	(2σ+/-)						
Radium-226	0.899		0.204	0.224	1.00	0.144	pCi/g	08/19/15 12:36	09/09/15 07:08	1

Client Sample ID: HD01-SS008-0012-01

Lab Sample ID: 160-13353-9

Date Collected: 08/12/15 12:20

Matrix: Solid

Date Received: 08/14/15 13:25

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			Uncert.	(2σ+/-)						
Radium-226	54.1		1.88	5.93	1.00	1.22	pCi/g	08/19/15 12:36	09/09/15 07:08	1

Client Sample ID: RB-H-1508012

Lab Sample ID: 160-13353-10

Date Collected: 08/12/15 14:30

Matrix: Water

Date Received: 08/14/15 13:25

Method: 9315 - Radium-226 (GFPQ)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dl Fac
			Uncert.	(2σ+/-)						
Radium-226	0.00984	U	0.0515	0.0515	1.00	0.0953	pCi/L	08/17/15 12:43	09/09/15 16:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dl Fac
Ba Carrier	95.6		40 - 110					08/17/15 12:43	09/09/15 16:36	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Client Sample ID: RB-H-1508012

Lab Sample ID: 160-13353-10

Date Collected: 08/12/15 14:30

Matrix: Water

Date Received: 08/14/15 13:25

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-228	-0.0667	U	0.188	0.188	1.00	0.349	pCi/L	08/17/15 12:53	09/02/15 11:49	1
Carrier										
Ba Carrier	95.6		40 - 110					08/17/15 12:53	09/02/15 11:49	1
Y Carrier	92.7		40 - 110					08/17/15 12:53	09/02/15 11:49	1

Tracer/ Carrier Summary

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/ NA

Lab Sample ID	Client Sample ID	Ba (40-110)
160-13353-10	RB-H 1508012	95.6
LCS 160-206049/2-A	Lab Control Sample	93.8
NB 160-206049/1-A	Method Bank	108

Percent Yield (Acceptance Limits)

Tracer/ Carrier Legend

Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/ NA

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
160-13353-10	RB-H 1508012	95.6	92.7
LCS 160-206051/2-A	Lab Control Sample	93.8	97.2
NB 160-206051/1-A	Method Bank	108	95.0

Percent Yield (Acceptance Limits)

Tracer/ Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Method: 9315 - Radium-226 (GPC)

Lab Sample ID: MB 160-206049/ 1-A

Matrix: Water

Analysis Batch: 209746

Analyte	MB MB		Count Uncert.	Total Uncert.		RL	MDC	Unit	Prepared	Analyzed	Dl Fac
	Result	Qualifier		(2σ+/-)	(2σ+/-)						
Radium-226	0.04599	U	0.0533	0.0535	1.00	0.0873	pG/L		08/17/15 12:43	09/08/15 07:11	1
<i>Carrier</i>	<i>MB MB</i>	<i>%Yield Qualifier</i>	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	<i>Dl Fac</i>
Ba Carrier	108		40 - 110						08/17/15 12:43	09/08/15 07:11	1

Lab Sample ID: LCS 160-206049/ 2-A

Matrix: Water

Analysis Batch: 209746

Analyte	Spike		LCS Added	LCS Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits
	Added	Result				Uncert.	(2σ+/-)					
Radium-226	11.2	12.61				1.24	1.00	1.00	0.115	pG/L	113	68 - 137
<i>Carrier</i>	<i>LCS LCS</i>	<i>%Yield Qualifier</i>	<i>Limits</i>									
Ba Carrier	93.8		40 - 110									

Method: 9320 - Radium-228 (GPC)

Lab Sample ID: MB 160-206051/ 1-A

Matrix: Water

Analysis Batch: 209120

Analyte	MB MB		Count Uncert.	Total Uncert.		RL	MDC	Unit	Prepared	Analyzed	Dl Fac
	Result	Qualifier		(2σ+/-)	(2σ+/-)						
Radium-228	-0.02918	U	0.191	0.191	1.00	0.342	pG/L		08/17/15 12:53	09/02/15 11:49	1
<i>Carrier</i>	<i>MB MB</i>	<i>%Yield Qualifier</i>	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	<i>Dl Fac</i>
Ba Carrier	108		40 - 110						08/17/15 12:53	09/02/15 11:49	1
Y Carrier	95.0		40 - 110						08/17/15 12:53	09/02/15 11:49	1

Lab Sample ID: LCS 160-206051/ 2-A

Matrix: Water

Analysis Batch: 209120

Analyte	Spike		LCS Added	LCS Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits
	Added	Result				Uncert.	(2σ+/-)					
Radium-228	3.30	2.458				0.426	1.00	1.00	0.355	pG/L	74	56 - 140
<i>Carrier</i>	<i>LCS LCS</i>	<i>%Yield Qualifier</i>	<i>Limits</i>									
Ba Carrier	93.8		40 - 110									
Y Carrier	97.2		40 - 110									

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-206493/ 1-A

Matrix: Solid

Analysis Batch: 210004

Analyte	Result	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	DL Fac
				Uncert.	Uncert.						
Radium-226	-0.06232	U		1.11	1.11	1.00	0.159	pCi/g	08/19/15 12:18	09/09/15 07:38	1

Lab Sample ID: LCS 160-206493/ 2-A

Matrix: Solid

Analysis Batch: 210003

Analyte	Added	Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	Limits
			Result	Qual	(2σ+/-)					
Americium-241		97.2	97.53		10.2		1.17	pCi/g	100	87 - 116
Cesium-137		30.2	30.36		3.23		0.256	pCi/g	101	87 - 120
Cobalt-60		18.9	19.06		1.96		0.0973	pCi/g	101	87 - 115

Lab Sample ID: MB 160-206498/ 1-A

Matrix: Solid

Analysis Batch: 210004

Analyte	Result	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	DL Fac
				Uncert.	Uncert.						
Radium-226	0.001777	U		0.0837	0.0837	1.00	0.172	pCi/g	08/19/15 12:36	09/09/15 06:59	1

Lab Sample ID: LCS 160-206498/ 2-A

Matrix: Solid

Analysis Batch: 210003

Analyte	Added	Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	Limits
			Result	Qual	(2σ+/-)					
Americium-241		97.2	98.29		10.3		1.27	pCi/g	101	87 - 116
Cesium-137		30.2	31.08		3.31		0.300	pCi/g	103	87 - 120
Cobalt-60		18.9	19.09		1.97		0.114	pCi/g	101	87 - 115

Lab Sample ID: 160-13353-9 DU

Matrix: Solid

Analysis Batch: 209998

Analyte	Result	Sample	Sample	DU	DU	Uncert.	(2σ+/-)	RL	MDC	Unit	RER	Limit
				Qual	Qual							
Radium-226	54.1			54.33		5.83		1.00	0.901	pCi/g	0.02	1

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
 Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Rad

Leach Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-2	H001-SS002-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-3	H001-SS003-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-4	H001-SS004-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-5	H001-SS005-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-6	H001-SS005-0012-02	Total/ NA	Solid	Dy and Gind	
160-13353-7	H001-SS006-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-8	H001-SS007-0618-01	Total/ NA	Solid	Dy and Gind	
160-13353-9	H001-SS008-0012-01	Total/ NA	Solid	Dy and Gind	
160-13353-9 DU	H001-SS008-0012-01	Total/ NA	Solid	Dy and Gind	

Prep Batch: 206049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	RecSep-21	
LCS 160-206049/ 2-A	Lab Control Sample	Total/ NA	Water	RecSep-21	
NB 160-206049/ 1-A	Method Bank	Total/ NA	Water	RecSep-21	

Prep Batch: 206051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-10	RB-H 1508012	Total/ NA	Water	RecSep_0	
LCS 160-206051/ 2-A	Lab Control Sample	Total/ NA	Water	RecSep_0	
NB 160-206051/ 1-A	Method Bank	Total/ NA	Water	RecSep_0	

Prep Batch: 206493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-2	H001-SS002-0012-01	Total/ NA	Solid	FII_Geo-21	205721
LCS 160-206493/ 2-A	Lab Control Sample	Total/ NA	Solid	FII_Geo-21	
NB 160-206493/ 1-A	Method Bank	Total/ NA	Solid	FII_Geo-21	

Prep Batch: 206498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-3	H001-SS003-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-4	H001-SS004-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-5	H001-SS005-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-6	H001-SS005-0012-02	Total/ NA	Solid	FII_Geo-21	205721
160-13353-7	H001-SS006-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-8	H001-SS007-0618-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-9	H001-SS008-0012-01	Total/ NA	Solid	FII_Geo-21	205721
160-13353-9 DU	H001-SS008-0012-01	Total/ NA	Solid	FII_Geo-21	205721
LCS 160-206498/ 2-A	Lab Control Sample	Total/ NA	Solid	FII_Geo-21	
NB 160-206498/ 1-A	Method Bank	Total/ NA	Solid	FII_Geo-21	

Analysis Batch: 173680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
AC/R#6 160-173680/ 1	ACV			GFC_SUM	

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

(Continued)

Analysis Batch: 181562

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
AO/ABT 160-181562/1	AOV			GFP_C_SLM	
AO/ABT 160-181562/2	AOV			GFP_C_SLM	
AO/ABT 160-181562/3	AOV			GFP_C_SLM	

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-2

Client Sample ID: HD01-SS001-0012-01

Date Collected: 08/12/15 09:37

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-21		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS002-0012-01

Date Collected: 08/12/15 14:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-21		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-21		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS004-0012-01

Date Collected: 08/12/15 11:08

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-21		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-21		
Total/NA	Analysis	GA-01-R		1

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-2

Client Sample ID: HD01-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206498	08/19/15 12:36	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210008	09/09/15 07:04	ALS	TAL SL

Client Sample ID: HD01-SS006-0012-01

Date Collected: 08/12/15 11:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206498	08/19/15 12:36	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209999	09/09/15 07:07	ALS	TAL SL

Client Sample ID: HD01-SS007-0618-01

Date Collected: 08/12/15 13:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206498	08/19/15 12:36	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	209998	09/09/15 07:08	ALS	TAL SL

Client Sample ID: HD01-SS008-0012-01

Date Collected: 08/12/15 12:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			206498	08/19/15 12:36	R1S	TAL SL
Total/NA	Analysis	GA-01-R		1	210000	09/09/15 07:08	ALS	TAL SL

Client Sample ID: RB-H-1508012

Date Collected: 08/12/15 14:30

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			206049	08/17/15 12:43	JAC	TAL SL
Total/NA	Analysis	9315		1	210020	09/09/15 16:36	CDH	TAL SL
Total/NA	Prep	PrecSep_0			206051	08/17/15 12:53	CMC	TAL SL
Total/NA	Analysis	9320		1	209120	09/02/15 11:49	MFM	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

Certification Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-2

Laboratory: TestAmerica St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
GA-01-R	Fill_Geo-21	Solid	Radium-226
New Jersey	NELAP	2	MO002

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9315	PrecSep-21	Water	Radium-226

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
9320	PrecSep_0	Water	Radium-228
GA-01-R	Fill_Geo-21	Solid	Radium-226

* Certification renewal pending - certification considered valid.

TestAmerica St. Louis

Method Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
GFPC_SUM			TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

Sample Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13353-1	H001-SS001-0012-01	Solid	08/12/15 09:37	08/14/15 13:25
160-13353-2	H001-SS002-0012-01	Solid	08/12/15 14:20	08/14/15 13:25
160-13353-3	H001-SS003-0012-01	Solid	08/12/15 11:45	08/14/15 13:25
160-13353-4	H001-SS004-0012-01	Solid	08/12/15 11:08	08/14/15 13:25
160-13353-5	H001-SS005-0012-01	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-6	H001-SS005-0012-02	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-7	H001-SS006-0012-01	Solid	08/12/15 11:00	08/14/15 13:25
160-13353-8	H001-SS007-0618-01	Solid	08/12/15 13:20	08/14/15 13:25
160-13353-9	H001-SS008-0012-01	Solid	08/12/15 12:20	08/14/15 13:25
160-13353-10	RB-H 1508012	Water	08/12/15 14:30	08/14/15 13:25

TestAmerica St. Louis

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis

Job No.: 160-13353-2

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent			Concentration
					Reagent ID	Volume Added	Analyte	
Ba_Carrier_00013	06/19/16		CPI, Lot 15F100		(Purchased Reagent)		Ba Carrier	20000 ug/mL
Marn_Soil_00002	03/01/16		Eckert & Ziegler, Lot 83814-334		(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Pb-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17		Eckert & Ziegler, Lot 90099		(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Pb-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
Ra-226_00008					Gross Alpha			
					Gross Beta			
					Ra-226_00003	3 mL	Ra	25.0433 dpm/mL
							Radium-226	25.0433 dpm/mL
							Total Alpha Emitting Radium Isotopes	25.0433 dpm/mL
.Ra-226_00003	09/09/41	03/07/03	1M HNO3, Lot 0	100 mL	Ra-226_00001	5.0931 g	Ra	8347.78 dpm/mL
							Radium-226	8347.78 dpm/mL
							Total Alpha Emitting Radium Isotopes	8347.78 dpm/mL
..Ra-226_00001	09/09/41		NIST, Lot SRM 4967		(Purchased Reagent)		Ra	2729 Bq/g
							Radium-226	2729 Bq/g
							Total Alpha Emitting Radium Isotopes	2729 Bq/g
Ra-226_00014	11/04/15	10/10/13	1M HNO3, Lot n/a	1000 mL	Ra-226_00003	3 mL	Ra	25.0433 dpm/mL
							Radium-226	25.0433 dpm/mL
							Total Alpha Emitting Radium Isotopes	25.0433 dpm/mL
.Ra-226_00003	09/09/41	03/07/03	1M HNO3, Lot 0	100 mL	Ra-226_00001	5.0931 g	Ra	8347.78 dpm/mL

Shipping and Receiving Documents

USEPA

Date Shipped: 8/13/2015

Carrier Name: FedEx

Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-173446-0001

Cooler #: 1

Lab: TestAmerica Laboratories, Inc. - St. Louis

Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
1	H001-SSC01-0012-01	Mercury	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Thorium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Uranium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Gamma Spectroscopy	Soil	8/12/2015	09:37	1	32 oz glass jar	4 C	N
	H001-SSC01-0012-01	TAL Metals	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
2	H001-SSC02-0012-01	TAL Metals	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Mercury	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Thorium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Uranium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Gamma Spectroscopy	Soil	8/12/2015	14:20	1	32 oz glass jar	4 C	N
3	H001-SSC03-0012-01	TAL Metals	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:45	1	32 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Uranium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Mercury	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Thorium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
4	H001-SSC04-0012-01	TAL Metals	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Mercury	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Isotopic Thorium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #			
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252			

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all sample containers	Joel Petty RST3	8/13/15 1900	Joe Clark TA STC	8-14-15 1325	



160-13353 Chain of Custody

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-173446-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St.
Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS004-0012-01	Isotopic Uranium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SS004-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:08	1	32 oz glass jar	4 C	N
5	H001-SS005-0012-01	Isotopic Uranium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	TAL Metals	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	Gamma Spectroscopy	Soil	8/12/2015	10:28	2	32 oz glass jar	4 C	Y
	H001-SS005-0012-01	Isotopic Thorium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
6	H001-SS005-0012-01	Mercury	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-02	Gamma Spectroscopy	Soil	8/12/2015	10:28	1	32 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Uranium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Thorium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Mercury	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	TAL Metals	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
7	H001-SS006-0012-01	TAL Metals	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Mercury	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Thorium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Uranium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:00	1	32 oz glass jar	4 C	N
8	H001-SS007-0618-01	Isotopic Thorium	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	SAMPLES TRANSFERRED FROM	
				CHAIN OF CUSTODY #	Date/Time
All samples	Joel Petty Best	8/13/15 10:00	Joel Clark TAST	8-14-15 1325	

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbary@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx

AirbillNo: 8037 9862 5956

CHAIN OF CUSTODY-RECORD

Case #: 338

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-173446-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS007-0618-01	Isotopic Uranium	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	Mercury	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	TAL Metals	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N
	H001-SS007-0618-01	Gamma Spectroscopy	Soil	8/12/2015	13:20	1	32 oz glass jar	4 C	N
Q	H001-SS008-0012-01	Mercury	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Thorium	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Uranium	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N
	H001-SS008-0012-01	Gamma Spectroscopy	Soil	8/12/2015	13:30	1	32 oz glass jar	4 C	N
	H001-SS008-0012-01	TAL Metals	Soil	8/12/2015	13:30	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM		
CHAIN OF CUSTODY #		
Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252		

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
all samples	Joel Petty AST2	8/13/15 1:00	Jill Clark TA STZ	8-14-15 K325	

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-13353-2

Login Number: 13353

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

Job Number: 160-13353-3

Job Description: EPA RST2 - RFP No. 338

For:

Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837

Attention: Ms. Smita Sumbaly



Approved for release.
Rhonda E Ridenhower
Manager of Project Management
8/27/2015 11:22 AM

Rhonda E Ridenhower, Manager of Project Management
13715 Rider Trail North, Earth City, MO, 63045
rhonda.ridenhower@testamericainc.com
08/27/2015

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North, Earth City, MO 63045
Tel (314) 298-8566 Fax (314) 298-8757 www.testamericainc.com

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Definitions/ Glossary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP Nb. 338

TestAmerica Job ID 160-13353-3

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation **These commonly used abbreviations may or may not be present in this report.**

dw	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
QFL	Contains Free Liquid
QNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DF Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
NDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Doxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
REER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RFD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Doxin)
TEQ	Toxicity Equivalent Quotient (Doxin)

CASE NARRATIVE

Client: Weston Solutions, Inc.

Project: EPA RST2 - RFP No. 338

Report Number: 160-13353-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a 'solids' value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client. ☐

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 08/14/2015; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 3.2° C, 4.5° C, 4.7° C and 5.3° C.

RADIUM 226 (NO INGROWTH)

Samples H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8) and H001-SS008-0012-01 (160-13353-9) were analyzed for Radium 226 (No ingrowth) in accordance with GA-01-R. The samples were dried on 08/15/2015, prepared on 08/19/2015 and analyzed on 08/22/2015 and 08/23/2015.

Gamma Prep Batch: 206988

Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. B-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. This laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.

The MDC was greater than the requested limit of 1 pCi/g for Radium-226. Radium-226 was requested to be reported with no ingrowth for this batch; therefore, samples were reported from the only usable gamma energy line, 185.99 keV. This energy line has a low efficiency which causes an elevated MDC. The following samples are affected: H001-SS003-0012-01 (160-13353-3), H001-SS004-0012-01 (160-13353-4), H001-SS005-0012-01 (160-13353-5), H001-SS005-0012-02 (160-13353-6), H001-SS006-0012-01 (160-13353-7), H001-SS007-0618-01 (160-13353-8), H001-SS008-0012-01 (160-13353-9), (LCS 160-206988/2-A), (MB 160-206988/1-A) and (160-13353-E-9-H DJ).

Gamma Prep Batch 206989:

Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. B-214) after sealing the sample in an

appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. T laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.

The MDC was greater than the requested limit of 1 pCi/g for Radium-226. Radium-226 was requested to be reported with no ingrowth for this batch; therefore, samples were reported from the only usable gamma energy line, 185.99 KeV. This energy line has a low efficiency which causes an elevated MDC. The following samples were affected: H001-SS001-0012-01 (160-13353-1), H001-SS002-0012-01 (160-13353-2), (LCS 160-206989/2-A), (MB 160-206989/1-A), (160-13352-E-1-G) and (160-13352-E-1-H DJ).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Client Sample ID HD01-SS001-0012-01

Date Collected: 08/12/15 09:37

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	0.306		0.115	0.120		0.118	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Radium-226	4.22		1.74	1.89	1.00	1.89	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Radium-228	1.38		0.336	0.364		0.271	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Other Detected			Count	Total						
Radionuclides			Uncert.	(2σ+/-)						
Ac-228	1.38		0.336	0.364		0.271	pCi/g	08/19/15 12:18	08/22/15 16:30	1
B-214	0.823		0.218	0.234		0.180	pCi/g	08/19/15 12:18	08/22/15 16:30	1
K-40	18.1		2.87	3.41		2.01	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Rb-212	1.04		0.252	0.285		0.249	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Rb-214	0.894		0.181	0.203		0.175	pCi/g	08/19/15 12:18	08/22/15 16:30	1
Tl-208	0.377		0.105	0.112		0.0893	pCi/g	08/19/15 12:18	08/22/15 16:30	1

Client Sample ID HD01-SS002-0012-01

Date Collected: 08/12/15 14:20

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	-0.0205	U	0.146	0.146		0.248	pCi/g	08/19/15 12:18	08/23/15 19:13	1
Radium-226	82.5		6.59	15.8	1.00	6.35	pCi/g	08/19/15 12:18	08/23/15 19:13	1
Radium-228	0.549	U	0.490	0.494		0.824	pCi/g	08/19/15 12:18	08/23/15 19:13	1
Other Detected			Count	Total						
Radionuclides			Uncert.	(2σ+/-)						
B-210	20.0		5.61	6.08		6.94	pCi/g	08/19/15 12:18	08/23/15 19:13	1
B-214	36.4		0.989	3.91		0.424	pCi/g	08/19/15 12:18	08/23/15 19:13	1
K-40	4.62		1.53	1.60		2.15	pCi/g	08/19/15 12:18	08/23/15 19:13	1
Rb-210	20.0		5.61	6.08		6.94	pCi/g	08/19/15 12:18	08/23/15 19:13	1
Rb-214	38.3		0.877	4.08		0.531	pCi/g	08/19/15 12:18	08/23/15 19:13	1

Client Sample ID HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID 160-13353-3

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	0.156	U	0.439	0.439		0.735	pCi/g	08/19/15 12:36	08/22/15 17:04	1
Radium-226	175		14.6	33.9	1.00	15.1	pCi/g	08/19/15 12:36	08/22/15 17:04	1
Radium-228	49.0		2.63	5.65		1.94	pCi/g	08/19/15 12:36	08/22/15 17:04	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
	Ac-228	49.0		2.63	5.65		1.94	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	B-212	57.4		7.92	9.91		6.72	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	B-214	78.1		2.21	8.41		1.20	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	K-40	18.0		5.03	5.35		4.75	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	Rb-210	25.0		9.95	10.4		13.5	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	Rb-212	48.2		1.41	6.40		1.20	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	Rb-214	79.0		1.87	8.42		1.39	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	Th-234	62.9		11.6	13.3		14.5	pCi/g	08/19/15 12:36	08/22/15 17:04	1
	Tl-208	16.5		0.721	1.86		0.595	pCi/g	08/19/15 12:36	08/22/15 17:04	1

Client Sample ID: HD01-SS004-0012-01

Date Collected: 08/12/15 11:08

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-4

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)											
Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
Cesium-137		0.0533	U	0.0888	0.0890		0.159	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Radium-226		4.87		1.86	2.05	1.00	1.88	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Radium-228		1.39		0.328	0.357		0.283	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Other Detected											
Radionuclides	Result	Qualifier		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
Ac-228		1.39		0.328	0.357		0.283	pCi/g	08/19/15 12:36	08/22/15 17:05	1
B-214		1.12		0.215	0.244		0.109	pCi/g	08/19/15 12:36	08/22/15 17:05	1
K-40		18.3		2.59	3.20		1.06	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Rb-212		1.19		0.199	0.252		0.175	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Rb-214		0.957		0.205	0.228		0.184	pCi/g	08/19/15 12:36	08/22/15 17:05	1
Tl-208		0.421		0.114	0.122		0.0977	pCi/g	08/19/15 12:36	08/22/15 17:05	1

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-5

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)											
Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
Cesium-137		0.0980	U	0.0687	0.0694		0.103	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Radium-226		2.56		0.938	1.04	1.00	1.20	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Radium-228		0.579		0.243	0.250		0.319	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Other Detected											
Radionuclides	Result	Qualifier		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)						
B-214		0.710		0.212	0.225		0.204	pCi/g	08/19/15 12:36	08/22/15 17:06	1
K-40		16.8		2.05	2.67		0.939	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Rb-212		0.962		0.174	0.214		0.152	pCi/g	08/19/15 12:36	08/22/15 17:06	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-5

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
	Rb-214	0.948		0.164	0.191		0.107	pCi/g	08/19/15 12:36	08/22/15 17:06	1
	Tl-208	0.387		0.0935	0.102		0.0683	pCi/g	08/19/15 12:36	08/22/15 17:06	1

Client Sample ID: HD01-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
Cesium-137		0.255		0.116	0.119		0.104	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Radium-226		3.05		1.37	1.47	1.00	1.66	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Radium-228		0.945		0.238	0.256		0.389	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
Ac-228		0.945		0.238	0.256		0.389	pCi/g	08/19/15 12:36	08/22/15 17:06	1
B-214		0.716		0.184	0.198		0.170	pCi/g	08/19/15 12:36	08/22/15 17:06	1
K-40		18.7		2.41	3.08		0.948	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Rb-212		0.947		0.209	0.242		0.218	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Rb-214		0.867		0.212	0.230		0.198	pCi/g	08/19/15 12:36	08/22/15 17:06	1
Tl-208		0.293		0.0976	0.102		0.100	pCi/g	08/19/15 12:36	08/22/15 17:06	1

Client Sample ID: HD01-SS006-0012-01

Date Collected: 08/12/15 11:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-7

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
Cesium-137		0.285		0.112	0.116		0.105	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Radium-226		2.15 U		2.03	2.06	1.00	2.62	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Radium-228		1.25		0.309	0.335		0.318	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Other Detected	Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
Ac-228		1.25		0.309	0.335		0.318	pCi/g	08/19/15 12:36	08/22/15 17:36	1
B-214		1.07		0.249	0.272		0.215	pCi/g	08/19/15 12:36	08/22/15 17:36	1
K-40		16.1		2.47	2.97		2.05	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Rb-212		1.09		0.226	0.267		0.227	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Rb-214		1.05		0.220	0.245		0.237	pCi/g	08/19/15 12:36	08/22/15 17:36	1
Tl-208		0.415		0.120	0.127		0.108	pCi/g	08/19/15 12:36	08/22/15 17:36	1

TestAmerica St. Louis

Client Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Client Sample ID: HD01-SS007-0618-01

Date Collected: 08/12/15 13:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	0.181		0.0809	0.0830		0.101	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Radium-226	2.16		1.33	1.38	1.00	2.11	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Radium-228	1.27		0.331	0.356		0.209	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Other Detected			Count	Total						
Radionuclides			Uncert.	(2σ+/-)						
Ac-228	1.27		0.331	0.356		0.209	pCi/g	08/19/15 12:36	08/22/15 17:37	1
B-214	0.870		0.251	0.267		0.229	pCi/g	08/19/15 12:36	08/22/15 17:37	1
K-40	19.9		3.05	3.67		1.28	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Rb-212	1.23		0.265	0.309		0.254	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Rb-214	0.988		0.247	0.268		0.214	pCi/g	08/19/15 12:36	08/22/15 17:37	1
Tl-208	0.371		0.127	0.133		0.112	pCi/g	08/19/15 12:36	08/22/15 17:37	1

Client Sample ID: HD01-SS008-0012-01

Date Collected: 08/12/15 12:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-9

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Cesium-137	-0.0625	U	1.20	1.20		0.776	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Radium-226	127		11.9	25.2	1.00	12.4	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Radium-228	65.3		2.13	6.99		1.42	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Other Detected			Count	Total						
Radionuclides			Uncert.	(2σ+/-)						
Ac-228	65.3		2.13	6.99		1.42	pCi/g	08/19/15 12:36	08/22/15 17:39	1
B-212	72.4		7.68	10.8		6.37	pCi/g	08/19/15 12:36	08/22/15 17:39	1
B-214	52.0		1.54	5.61		0.955	pCi/g	08/19/15 12:36	08/22/15 17:39	1
K-40	13.9		4.03	4.27		3.60	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Rb-210	25.0		12.4	12.7		14.7	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Rb-212	66.9		1.31	8.75		1.09	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Rb-214	57.8		1.64	6.22		1.16	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Th-234	41.9		9.09	10.1		11.9	pCi/g	08/19/15 12:36	08/22/15 17:39	1
Tl-208	23.2		0.821	2.54		0.565	pCi/g	08/19/15 12:36	08/22/15 17:39	1

TestAmerica St. Louis

QC Sample Results

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-206988/ 1-A

Matrix: Solid

Analysis Batch: 207358

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	(2σ+/-)						
Cesium-137	-0.01457	U	0.0562	0.0562		0.101	pCi/g	08/19/15 12:36	08/24/15 15:32	1
Radium-226	-0.5482	U	21.9	21.9	1.00	1.28	pCi/g	08/19/15 12:36	08/24/15 15:32	1
Radium-228	0.1147	U	0.111	0.112		0.156	pCi/g	08/19/15 12:36	08/24/15 15:32	1
Other Detected			Count	Total						
Radionuclides	MB	MB	Uncert.	Uncert.						
<i>Other Detected</i>	<i>Result</i>	<i>Qualifier</i>	<i>(2σ+/-)</i>	<i>(2σ+/-)</i>						
<i>Radionuclide</i>	<i>None</i>						pCi/g	08/19/15 12:36	08/24/15 15:32	1

Lab Sample ID: LCS 160-206988/ 2-A

Matrix: Solid

Analysis Batch: 207147

Analyte	Spike Added	LCS Result	LCS		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Limits
			Qual	Total						
Americium-241	97.3	100.8		10.6			1.20	pCi/g	104	87 - 116
Cesium-137	30.2	30.83		3.28			0.255	pCi/g	102	87 - 120
Cobalt-60	19.0	18.65		1.93			0.185	pCi/g	98	87 - 115

Lab Sample ID: 160-13353-9 DU

Matrix: Solid

Analysis Batch: 207152

Analyte	Sample Sample		DU DU		Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual						
Cesium-137	-0.0625	U	0.3904		0.303		0.342	pCi/g	0.30	1
Radium-226	127		121.6		23.8	1.00	11.0	pCi/g	0.11	1
Radium-228	65.3		65.08		6.79		1.15	pCi/g	0.02	1
Other Detected	Sample	Sample	DU	DU	Uncert.					
Radionuclides	Result	Qual	Result	Qual	(2σ+/-)					
Ac-228	65.3		65.08		6.79		1.15	pCi/g	0.02	1
B-212	72.4		69.90		8.91		4.41	pCi/g	0.13	1
B-214	52.0		52.12		5.56		0.746	pCi/g	0.02	1
Eu-155	4.60		3.938		1.17		1.30	pCi/g	0.26	1
K-40	13.9		17.37		4.70		3.35	pCi/g	0.39	1
Pb-210	25.0		20.36		7.73		9.69	pCi/g	0.23	1
Pb-212	66.9		67.43		8.81		1.01	pCi/g	0.03	1
Pb-214	57.8		56.06		5.95		0.991	pCi/g	0.14	1
Th-234	41.9		34.92		5.44		10.7	pCi/g	0.45	1
Tl-208	23.2		22.69		2.45		0.444	pCi/g	0.09	1

Client Sample ID: Lab Control Sample
Prep Type: Total/ NA
Prep Batch: 206988

Client Sample ID: H001-SS008-0012-01
Prep Type: Total/ NA
Prep Batch: 206988

QC Sample Results

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-206989/ 1-A

Matrix: Solid

Analysis Batch: 207147

Client Sample ID: Method Blank

Prep Type: Total/ NA

Prep Batch: 206989

Analyte	MB		MB		Count Uncert.	Total		RL	MDC	Unit	Prepared	Analyzed	Dl Fac
	Result	Qualifier	(2σ+/-)	(2σ+/-)		Uncert.	Total						
Cesium-137	0.0000	U	0.00805	0.00805				0.0603	pCi/g		08/19/15 12:18	08/22/15 13:52	1
Radium-226	-0.3606	U	1.44	1.44				1.00	pCi/g		08/19/15 12:18	08/22/15 13:52	1
Radium-228	0.03597	U	0.0802	0.0803				0.279	pCi/g		08/19/15 12:18	08/22/15 13:52	1
Other Detected	MB		MB		Count	Total							
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	Uncert.	Uncert.		RL	MDC	Unit	Prepared	Analyzed	Dl Fac
Other Detected	None								pCi/g		08/19/15 12:18	08/22/15 13:52	1
Radionuclide													

Lab Sample ID: LCS 160-206989/ 2-A

Matrix: Solid

Analysis Batch: 207148

Client Sample ID: Lab Control Sample

Prep Type: Total/ NA

Prep Batch: 206989

Analyte	Spike Added	LCS Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits
				(2σ+/-)	Uncert.					
Americium-241	97.3	101.2		10.7			1.29	pCi/g	104	87 - 116
Cesium-137	30.2	30.01		3.25			0.419	pCi/g	99	87 - 120
Cobalt-60	19.0	18.85		1.97			0.0729	pCi/g	99	87 - 115

TestAmerica St. Louis

QC Association Summary

Client: Weston Solutions, Inc.
Project/ Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Rad

Leach Batch: 205721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-2	H001-SS002-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-3	H001-SS003-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-4	H001-SS004-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-5	H001-SS005-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-6	H001-SS005-0012-02	Total/NA	Solid	Dy and Gi nd	
160-13353-7	H001-SS006-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-8	H001-SS007-0618-01	Total/NA	Solid	Dy and Gi nd	
160-13353-9	H001-SS008-0012-01	Total/NA	Solid	Dy and Gi nd	
160-13353-9 DU	H001-SS008-0012-01	Total/NA	Solid	Dy and Gi nd	

Prep Batch: 206988

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-3	H001-SS003-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-4	H001-SS004-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-5	H001-SS005-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-6	H001-SS005-0012-02	Total/NA	Solid	F II_Geo-0	205721
160-13353-7	H001-SS006-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-8	H001-SS007-0618-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-9	H001-SS008-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-9 DU	H001-SS008-0012-01	Total/NA	Solid	F II_Geo-0	205721
LCS 160-206988/2-A	Lab Control Sample	Total/NA	Solid	F II_Geo-0	
NB 160-206988/1-A	Method Blank	Total/NA	Solid	F II_Geo-0	

Prep Batch: 206989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-13353-1	H001-SS001-0012-01	Total/NA	Solid	F II_Geo-0	205721
160-13353-2	H001-SS002-0012-01	Total/NA	Solid	F II_Geo-0	205721
LCS 160-206989/2-A	Lab Control Sample	Total/NA	Solid	F II_Geo-0	
NB 160-206989/1-A	Method Blank	Total/NA	Solid	F II_Geo-0	

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-3

Client Sample ID: HD01-SS001-0012-01

Date Collected: 08/12/15 09:37

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207150	08/22/15 16:30	ALS	TAL SL

Client Sample ID: HD01-SS002-0012-01

Date Collected: 08/12/15 14:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206989	08/19/15 12:18	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207166	08/23/15 19:13	RTM	TAL SL

Client Sample ID: HD01-SS003-0012-01

Date Collected: 08/12/15 11:45

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206988	08/19/15 12:36	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207148	08/22/15 17:04	RTM	TAL SL

Client Sample ID: HD01-SS004-0012-01

Date Collected: 08/12/15 11:08

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206988	08/19/15 12:36	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207150	08/22/15 17:05	ALS	TAL SL

Client Sample ID: HD01-SS005-0012-01

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			205721	08/15/15 13:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			206988	08/19/15 12:36	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	207152	08/22/15 17:06	RTM	TAL SL

TestAmerica St. Louis

Lab Chronicle

Client: Weston Solutions, Inc.
 Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-3

Client Sample ID: HD01-SS005-0012-02

Date Collected: 08/12/15 10:28

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-0		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS006-0012-01

Date Collected: 08/12/15 11:00

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-0		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS007-0618-01

Date Collected: 08/12/15 13:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-0		
Total/NA	Analysis	GA-01-R		1

Client Sample ID: HD01-SS008-0012-01

Date Collected: 08/12/15 12:20

Date Received: 08/14/15 13:25

Lab Sample ID: 160-13353-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor
Total/NA	Leach	Dry and Grind		
Total/NA	Prep	Fill_Geo-0		
Total/NA	Analysis	GA-01-R		1

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

Certification Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-3

Laboratory: TestAmerica St. Louis

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-16
New Jersey	NELAP	2	MO002	09-30-15

TestAmerica St. Louis

Method Summary

Client: Weston Solutions, Inc.

Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID: 160-13353-3

Method	Method Description
GA-01-R	Radium-226 & Other Gamma Emitters (GS)

Protocol	Laboratory
DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Weston Solutions, Inc.
Project/Site: EPA RST2 - RFP No. 338

TestAmerica Job ID 160-13353-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-13353-1	H001-SS001-0012-01	Solid	08/12/15 09:37	08/14/15 13:25
160-13353-2	H001-SS002-0012-01	Solid	08/12/15 14:20	08/14/15 13:25
160-13353-3	H001-SS003-0012-01	Solid	08/12/15 11:45	08/14/15 13:25
160-13353-4	H001-SS004-0012-01	Solid	08/12/15 11:08	08/14/15 13:25
160-13353-5	H001-SS005-0012-01	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-6	H001-SS005-0012-02	Solid	08/12/15 10:28	08/14/15 13:25
160-13353-7	H001-SS006-0012-01	Solid	08/12/15 11:00	08/14/15 13:25
160-13353-8	H001-SS007-0618-01	Solid	08/12/15 13:20	08/14/15 13:25
160-13353-9	H001-SS008-0012-01	Solid	08/12/15 12:20	08/14/15 13:25

TestAmerica St. Louis

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis

Job No.: 160-13353-3

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Parent Reagent				Concentration
				Reagent Final Volume	Reagent ID	Volume Added	Analyte	
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
				Source			Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq

Shipping and Receiving Documents

USEPA

Date Shipped: 8/13/2015

Carrier Name: FedEx

Airbill No: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-173446-0001Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St. Louis

Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
1	H001-SSC01-0012-01	Mercury	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Thorium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Isotopic Uranium	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
	H001-SSC01-0012-01	Gamma Spectroscopy	Soil	8/12/2015	09:37	1	32 oz glass jar	4 C	N
	H001-SSC01-0012-01	TAL Metals	Soil	8/12/2015	09:37	1	2 oz glass jar	4 C	N
2	H001-SSC02-0012-01	TAL Metals	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Mercury	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Thorium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Isotopic Uranium	Soil	8/12/2015	14:20	1	2 oz glass jar	4 C	N
	H001-SSC02-0012-01	Gamma Spectroscopy	Soil	8/12/2015	14:20	1	32 oz glass jar	4 C	N
3	H001-SSC03-0012-01	TAL Metals	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:45	1	32 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Uranium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Mercury	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
	H001-SSC03-0012-01	Isotopic Thorium	Soil	8/12/2015	11:45	1	2 oz glass jar	4 C	N
4	H001-SSC04-0012-01	TAL Metals	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Mercury	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SSC04-0012-01	Isotopic Thorium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM			
CHAIN OF CUSTODY #			

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	all samples Joel Petty RST3	8/13/15 1900	Dis Clark TA STC	8-14-15 1325	



160-13353 Chain of Custody

USEPA
DateShipped: 8/13/2015
CarrierName: FedEx
AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #: 338

Contact Name: Joel Petty
Contact Phone: 732-570-4943

No: 2-081315-173446-0001
Cooler #: 1
Lab: TestAmerica Laboratories, Inc. - St.
Louis
Lab Phone: 314-298-8566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS004-0012-01	Isotopic Uranium	Soil	8/12/2015	11:08	1	2 oz glass jar	4 C	N
	H001-SS004-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:08	1	32 oz glass jar	4 C	N
5	H001-SS005-0012-01	Isotopic Uranium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	TAL Metals	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-01	Gamma Spectroscopy	Soil	8/12/2015	10:28	2	32 oz glass jar	4 C	Y
	H001-SS005-0012-01	Isotopic Thorium	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
6	H001-SS005-0012-01	Mercury	Soil	8/12/2015	10:28	2	2 oz glass jar	4 C	Y
	H001-SS005-0012-02	Gamma Spectroscopy	Soil	8/12/2015	10:28	1	32 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Uranium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Isotopic Thorium	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	Mercury	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
	H001-SS005-0012-02	TAL Metals	Soil	8/12/2015	10:28	1	2 oz glass jar	4 C	N
7	H001-SS006-0012-01	TAL Metals	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Mercury	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Thorium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Isotopic Uranium	Soil	8/12/2015	11:00	1	2 oz glass jar	4 C	N
	H001-SS006-0012-01	Gamma Spectroscopy	Soil	8/12/2015	11:00	1	32 oz glass jar	4 C	N
8	H001-SS007-0618-01	Isotopic Thorium	Soil	8/12/2015	13:20	1	2 oz glass jar	4 C	N

SAMPLES TRANSFERRED FROM		
CHAIN OF CUSTODY #		

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbary@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
All samples	Joel Petty BST3	8/13/15 10:00	Joel Clark TAST2	8-14-15 1325	

USEPA DateShipped: 8/13/2014

CarrierName: FedEx

AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case # 338

Contact Name: Joel Petty

Contact Phone: 732-570-4943

No: 2-081315-173446-0001
Lab: TestAmerica Laboratories, Inc. - St. Louis
Cooler #: 1
12b Phono: 314 209 9566

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	H001-SS007-0618-01	Isotopic Uranium	Soil	8/12/2015	13:20		1 2 oz glass jar	4 C	N
	H001-SS007-0618-01	Mercury	Soil	8/12/2015	13:20		1 2 oz glass jar	4 C	N
	H001-SS007-0618-01	TAL Metals	Soil	8/12/2015	13:20		1 2 oz glass jar	4 C	N
	H001-SS007-0618-01	Gamma Spectroscopy	Soil	8/12/2015	13:20		1 32 oz glass jar	4 C	N
Q	H001-SS008-0012-01	Mercury	Soil	8/12/2015	13:30		1 2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Thorium	Soil	8/12/2015	13:30		1 2 oz glass jar	4 C	N
	H001-SS008-0012-01	Isotopic Uranium	Soil	8/12/2015	13:30		1 2 oz glass jar	4 C	N
	H001-SS008-0012-01	Gamma Spectroscopy	Soil	8/12/2015	13:30		1 32 oz glass jar	4 C	N
	H001-SS008-0012-01	TAL Metals	Soil	8/12/2015	13:30		1 2 oz glass jar	4 C	N

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0085252

USEPA

Date Shinned: 8/13/2015

CarrierName: EndEdit

AirbillNo: 8037 9662 5956

CHAIN OF CUSTODY RECORD

Case #. 338

Contact Name: [redacted] Betty

Contact Bhano: 733 570 1013

No.: 2-081315-175118-0003

二〇

Coulter #. 2

es, Inc. - St.

LOUIS

4298-8566

Special Instructions: Results for Radium-226 and Radium-228 analyzed via gamma spectroscopy should be reported separately for soil samples. Large fragments in many samples, please include fragments as part of sample. Email results to s.sumbaly@westonsolutions.com and joel.petty@westonsolutions.com. RFP 338, PO 0089252

Login Sample Receipt Checklist

Client: Weston Solutions, Inc.

Job Number: 160-13353-3

Login Number: 13353

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	